

MACWORLD

The Macintosh® Magazine

April 1990 \$3.95

Canada \$4.95

GRAY-SCALE SPECIAL

23 Monitors: Page 132 Imaging Software: Page 124

**MORE FOR
YOUR MEMORY**
All About RAM

MULTIMEDIA
Is It Real?

**APPLE'S
FONT STRATEGY**
Battle Royal

GEEK CHIC



There's a Word for

GOODE
Business Development

Date: September 1, 1998
To: Sam King
From: Theodore "Teddy" Bear
Re: 1998 Q3 Report
cc: Fred L. Lutz

As indicated, the quality of our work has been excellent. This is a great preview of the work we will do for you. Please contact me if you have any questions or need more information. We will be happy to provide you with the most comprehensive report possible. 40 pages and 100 photos.

Part of Share

We're Working!

We are currently working on the final report for the 1998 Q3 Report and will be providing you with the final report by the end of the month.

Item	1998	1997	1996	1995
Revenue	\$1,200,000	\$1,100,000	\$1,000,000	\$900,000
Expenses	\$800,000	\$750,000	\$700,000	\$650,000
Profit	\$400,000	\$350,000	\$300,000	\$250,000

Arbor Sales
Midwest region comes in at the top

Chicago - Arbor Sales, a leading provider of tree care services, has announced that it has won the contract to provide tree care services for the Midwest region. The contract is valued at \$1.2 million and will be in effect for the next three years.

Arbor Sales, a leading provider of tree care services, has announced that it has won the contract to provide tree care services for the Midwest region. The contract is valued at \$1.2 million and will be in effect for the next three years.

Competitive strategies

The Midwest region has been the most competitive in the industry. Arbor Sales has been able to win the contract by offering competitive prices and excellent customer service.

Tips for winning government bids

When bidding for government contracts, it is important to understand the requirements of the bid. Arbor Sales has been successful in winning government contracts by following these tips:

- 1. Understand the requirements of the bid.
- 2. Offer competitive prices.
- 3. Provide excellent customer service.

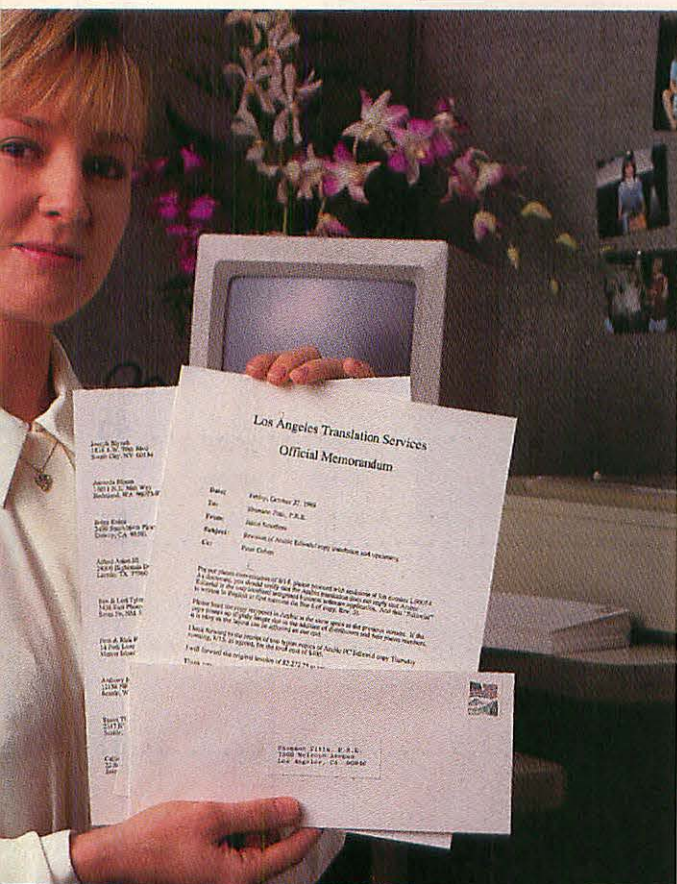


Calculations of Celestial Bodies

Using a series of calculations, the author has determined the positions of the planets and stars in the sky. The calculations are based on the principles of astronomy and are presented in a clear and concise manner.

The author has used a series of calculations to determine the positions of the planets and stars in the sky. The calculations are based on the principles of astronomy and are presented in a clear and concise manner.

r people like you.



Whether you're a marketing maven on your way up, a scientist knee-deep in formulas, or a temp trying to cope with an unfamiliar corporate mindset, when it comes to putting thoughts to paper, Microsoft is the Word for you.

And our users aren't the only ones who think so. Recently, the editors of *Mac User* gave Microsoft® Word version 4.0 the highest rating of any Macintosh® word processing program. Period.

A move we weren't altogether surprised by. You see, besides being perversely committed to research and development, we use a highly sophisticated approach to improving our product. We listen.

All of which has led to innovations like Word 4.0's powerful Table feature, enabling users to create side-by-side paragraphs, lists and even forms, without the hassle of dealing with tabs.

And since there *are* other word processing programs, Word 4.0 provides connectivity to Microsoft Word version 5.0 for the PC, PC WordPerfect®, DCA and other file formats. So now you can share your work with those less fortunate than yourself.

What's more, Word 4.0 is uniquely capable of delivering even more performance when it's used with other applications. For example, even highly educated executives can import Microsoft Excel tables and charts and automatically update them. Making it easy to ensure document accuracy. Plus, Microsoft Mail can be sent from within Word 4.0, significantly boosting work-group productivity.

For something a tad more informative than this ad, call (800) 541-1261, Dept. J92, to receive a brochure or ask for the location of your nearest dealer for a demo. You'll find that no matter what type of word processing you're performing, you could be doing it better.

Just take our Word for it.



Microsoft®
Making it all make sense®

Customers inside the 50 United States, call (800) 541-1261, Dept. J92. In Canada, call (416) 673-7638. Outside the U.S. and Canada, call (206) 882-8661. © Copyright 1989 Microsoft Corporation. All rights reserved. Microsoft and the Microsoft logo are registered trademarks and Making it all make sense is a trademark of Microsoft Corporation. Macintosh is a registered trademark of Apple Computer, Inc. WordPerfect is a registered trademark of WordPerfect Corporation.

CONTENTS

DEPARTMENTS



For the sharpest monochrome monitors, see page 132. On page 124, we contrast gray-scale editors. (Cover art by Arne Hurty. Stock photography by After-Image.)



A special report on the future of fonts, page 146.

How to Contact Macworld	12
MacBulletin	17
Commentary/Jerry Borrell	23
Letters	31
Art Beat	45
<i>By Deborah Branscum</i>	
The Iconoclast	51
<i>By Steven Levy</i>	
Conspicuous Consumer	71
<i>By Deborah Branscum</i>	
State of the Mac	81
<i>By Bruce F. Webster</i>	
News	93
<i>By Dan Littman and Tom Moran</i>	
New Products	209
How To/Quick Tips	219
<i>By Lon Poole</i>	
How To/Getting Started with Memory	235
<i>By Jim Heid</i>	
How To/Insights on PageMaker 4.0	243
<i>By Steve Roth</i>	
Updates	253
Where to Buy	259
Best-Sellers	300

FEATURES

Multimedia: Is It Real? 116

By Suzanne Stefanac and Liza Weiman A look at the promises and problems that face today's multimedia developers.

Gray-Scale Contrasts 124

By Joe Matazzoni New programs for manipulating black-and-white scans challenge Digital Darkroom and ImageStudio. Be sure you buy the best.

Monochrome Monitor Mania 132

By Robert C. Eckhardt Macworld picks the best and the brightest Macintosh monochrome and gray-scale monitors.

GeekChic 141

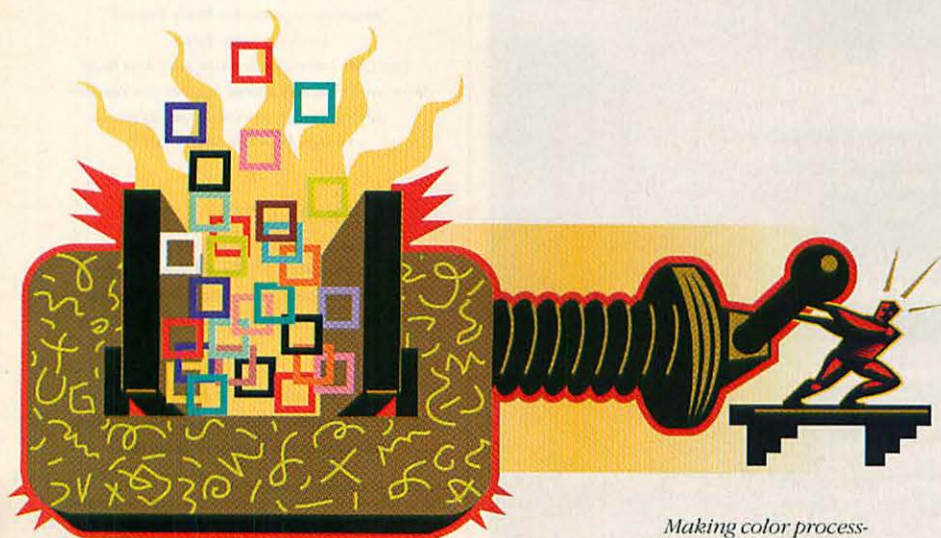
Haute tech is all the rage—our new weekly helps you stay in vogue.

Battle Royal 146

By Erfert Fenton Apple's Royal font format is poised to challenge PostScript. When the dust clears, will we find enhanced functionality or just greater chaos?

More for Your Memory 154

By Jim Heid Although new software gobbles up ever increasing amounts of memory, don't panic. Here's how to make the most of a limited resource.



Making color processing more manageable, page 81.



REVIEWS

QMS-PS 820 turbo 166
PostScript laser printer.

America Online 167
Online information service.

Prodigy 1.0 168
Online information service.

TrueForm 2.0 172
Electronic forms management.

DataFrame XP100,
DirectDrive 130,
MacinStor 100-ZFP 174
Three midcapacity hard drives.

PDS-IM 2.0 179
Point of sale-inventory management.

Fujitsu RX7100PS 181
PostScript printer.

MusicProse 1.0 183
Music composition and publishing software.

The Kurta Studio for Aldus
Products, Personal Writer
PW10 SL, Wacom SD-420L 186
Three graphics tablets.

Leprechaun 2.6 190
Color arcade-style game.

Calculator Construction
Set 2.06 192
On-screen calculator creator.

Traveller 40Mac 195
Removable hard disk system.

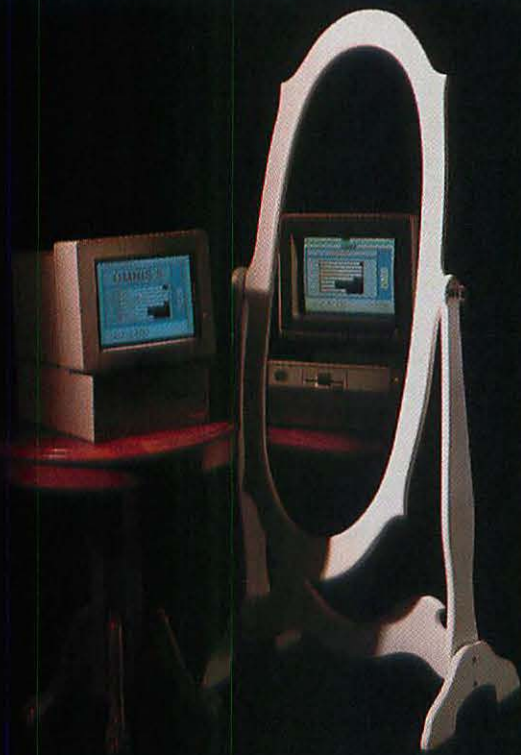
KaleidaGraph 2.0 197
Plotting and analysis program.

In/Out 1.0 199
Network sign-out board.

StrataVision 3D 1.0.2 201
Computer-aided drawing and visualization package.

Window Shopping 203
Nuts & HyperBolts 2.0, MacPhotography Workshop 1.02, Hand-Off, and Complete Undelete 1.0.

OMNIS 5



Look Again!

Yes, look at OMNIS 5 from Blyth Software. Omnis 5 is the only database that produces identical applications for Macintosh and IBM PC's or compatibles! You pick the development platform, your Omnis 5 application runs in both environments with the same easy graphic interface.

Today's business requires short learning curves and the high productivity of OMNIS 5. OMNIS 5's cross-platform compatibility simplifies support! One application serves all users on your mixed-platform network!

OMNIS 5 is the development platform of the 1990's!

For more information, call or write:

**BLYTH
SOFTWARE**

1065 E. Hillsdale Blvd., Suite 300
Foster City, CA 94404
In the US 1-800-843-8615, or in
CA 1-800-223-8050 or 415-571-0222

Circle 47 on reader service card.

MACWORLD

Editor-in-Chief Jerry Borrell

EDITORIAL

Executive Editor David Ushijima

Managing Editor Charles Barrett

Senior Editor/Features Adrian Mello

Editorial Manager Jane Lagas

Senior Associate Editor/Depts. Deborah Branscum

Senior Associate Editor/Lab Manager Chip Carman

Senior Associate Editor/Features Joe Matazzoni

Senior Associate Editor/East Coast Brita Meng

Senior Associate Editor/Reviews Carol Person

Senior Associate Editor/Features Cheryl E. Spencer

Associate Editors/News Dan Littman, Tom Moran

Associate Editor/Features Suzanne Stefanac

Associate Editor/Reviews Liza Weiman

Senior Production Editor Luis A. Camus

Senior Copy Editor Ruth Henrich

Assistant Editors Cathy E. Abes,

Mark Hurlow, Mary Margaret Lewis

Production Editor Annie Jenkel

Copy Editors Marjorie Baer, Emily Bower,

Felicity O'Meara, Katherine L. Ulrich

Production Assistant Lisa Brazieal

Editorial Assistant Julian C. R. Okwu

Editorial Administrative Assistants

Suzanne Courteau, Lyn Taylor

Assistant to the Editor-in-Chief Sandy Butler

Andrew Fluegelman Intern Jonathan Cassell

Contributing Editors Nancy E. Dunn, Robert C. Eckhardt, Erfert Fenton, Rob Hahn, Jim Heid, Dave Kosior,

Steven Levy, David Pogue, Lon Poole, Steve Roth,

Charles Seiter, Franklin N. Tessler, Bruce F. Webster

Overseas Editors Osmund Lind Iversen, Editor,

Australian Macworld, tel. 02-439-5133; Peter Worlock,

Editor, Macworld (U.K. edition), tel. 01-831-9252

ART AND DESIGN

Design Director Dennis McLeod

Art Director Joanne Hoffman

Assistant Art Director Nancy Paynter

Designer Leslie Barton

Designer/Informational Graphics Arne Hurty

Associate Designers Andrew Faulkner, Hao Yuen Kim

Senior Design Associate Tim Johnson

Design Associate Martha Katt

PRODUCTION

Director of Manufacturing Anne Foley

Production Manager Claudia Dawn Smukler

Advertising Billing Coordinator So Fong Yip

Advertising Traffic Coordinator Annette Garcia

President and Publisher

Macworld Communications, Inc. James E. Martin

Assistant to the President Susan Miller

April 1990, Volume 7, Number 4
Macworld (ISSN 0741-8647) is published monthly by Macworld Communications, Inc., 501 Second Street, San Francisco, CA 94107. Subscription rates are \$30 for 12 issues, \$60 for 24 issues, and \$90 for 36 issues. Foreign orders must be prepaid in U.S. funds with additional postage. Add \$16 per year from Canada and Mexico; add \$16 per year for surface mail or \$95 per year for airmail from all other countries. Second-class postage paid at San Francisco, California, and at additional mailing offices.

The New WriteNow Version 2.2.

Still Easy. Still Fast. And Still the Right Choice...

...But Now For Even More Reasons!

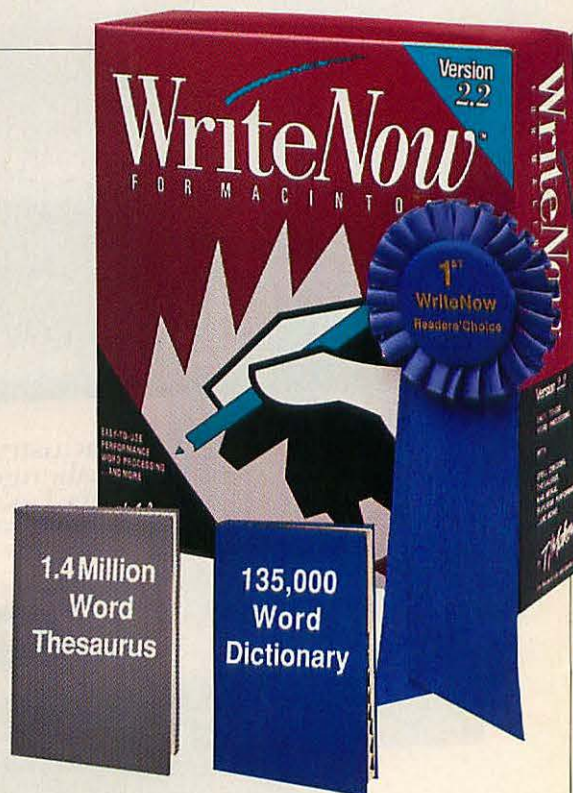
1.4 Million-Word Thesaurus How about 1.4 million new reasons? WriteNow now includes the Proximity WordMaster™ Thesaurus, containing 1.4 million synonyms, antonyms, compared, contrasted, and related word responses at your fingertips—it's the biggest in the Macintosh world!

135,000-Word Spelling Checker How about another 135,000 great new reasons? We've increased the size of our spelling checker to 135,000 words, making it the largest of any Macintosh word processor as well.

Direct Word 3.0 and Word 4.0 Compatibility Maybe you just need 3.0 or 4.0 good reasons? WriteNow is directly compatible with Microsoft Word 3.0 and Microsoft Word 4.0 documents.

Over a Dozen New Features & Usability Enhancements Or how about over a dozen new features and usability enhancements, like menu fonts, ruler guides, automatic window tiling & stacking, date formatting, powerful new format accelerators, direct input of font size, pre-designed mailing label templates for popular label sizes, and more.

The Word Processor of Choice in the Macintosh World Or how about just one really important reason: When you ask industry critics which word processor they use day-to-day, the answer is always the same: WriteNow. Still the word processor of choice in the Macintosh world.



Reviews

“WriteNow is the definitive Macintosh word processor. It's **easy to use, powerful, and comfortable**... Highly recommended.
—JOHN DVORAK, INDUSTRY COLUMNIST

[WriteNow] might be The **Best Program I'd Ever Used**. On any computer—it's **the fastest Macintosh word processor I've ever seen**.
—JIM SEYMOUR, MACUSER MAGAZINE

Even if WriteNow is your first Mac application, you'll be up and running in no time. We rate ease of learning **excellent**. ”
—INFOWORLD MAGAZINE

Awards

1989 Editors' Choice Award,
'Best New Word Processor'—MACUSER

1989 Readers' Choice Award,
'Best Word Processor'—MACAZINE

#1 Rated Word Processor in Macintosh
'PC Week Poll of Corporate Satisfaction.'
—PC WEEK MAGAZINE

Comparison of Leading Word Processors

	WriteNow 2.2	MacWrite II	Word	Works
Actual disk space needed:	(2) 800K	Hard disk	Hard disk	Hard disk
Thesaurus:	1.4 million	220,000	220,000	No
Spell Checker:	135,000	100,000	130,000	60,000
Mail Merge:	Yes	Yes	Yes	Yes
Format Accelerators:	Yes	No	Yes	No
Multiple Header/Footers:	Yes	No	Yes	No
Extensive Undo:	Yes	No	No	No
Retail Price:	\$195	\$249.95	\$395	\$295

For more information...

Registered users will receive WriteNow 2.2 upgrade information in the mail. Nonregistered users should call or write for details.

T/Maker Company
1390 Villa Street
Mountain View, CA 94041

Tel: (415) 962-0195 Fax: (415) 962-0201

See us at Macworld Expo, Booth #1217

Circle 332 on reader service card

T/Maker



Industry Challenged To Take Role In Education

PART IV SOLUTIONS



As we have seen, the inadequacy of the U.S. labor force is reaching crisis proportions. The average literacy level of today's young adults is below the

average level needed by the job market. In the next ten years, the job market will demand an ever higher level of proficiency in reading and math.

Many young adults with only a high school diploma or worse, will effectively be shut out from the job market as demand for unskilled, manual labor jobs decreases. This ever growing segment of the population will become a drag on the economy due to increased unemployment.

Corporations can ill afford not to try and remedy this situation, for if they do not, they will not have a satisfactory pool of job applicants from which to choose the workers to fill the positions which will develop in the next several years.

The jobs will have to be filled by unqualified, undereducated workers. This will create lower productivity and thus a lower standard of living across the board. This, of course, has worldwide implications as well, adversely affecting U.S.

competitiveness in the global marketplace. The corporate sector must step forward, accept responsibility, and make a commitment to the future of the U.S. labor force.

One of the most effective ways to improve the literacy skills of today's young adults is through the use of computers. Computers can provide a personalized learning experience for each student, allowing them to learn at their own pace and in their own style.

Computers can also provide a means for students to explore their interests and passions, leading to a more engaged and motivated learning experience. By using computers in the classroom, we can help to bridge the gap between the classroom and the real world, preparing students for the challenges of the future.

It is time for the corporate sector to step forward and take a leadership role in education. By investing in the education of our young people, we can ensure a bright and competitive future for the United States.

Let us work together to create a better future for all.

By [Name], [Title]

[Address]

[City, State, Zip]

[Phone Number]

[Email Address]

Industry Challenged To Take Role In Education

PART IV SOLUTIONS



As we have seen, the inadequacy of the U.S. labor force is reaching crisis proportions. The average literacy level of today's young adults is below the

average level needed by the job market. In the next ten years, the job market will demand an ever higher level of proficiency in reading and math. Many young adults with only a high school diploma or worse, will effectively be shut out from the job market as demand for unskilled, manual labor jobs decreases. This ever growing segment of the population will become a drag on the economy due to increased unemployment.

Corporations can ill afford not to try and remedy this situation, for if they do not, they will not have a satisfactory pool of job applicants from which to choose the workers to fill the positions which will develop in the next several years. The jobs will have to be filled by unqualified, undereducated workers.

This will create lower productivity and thus a lower standard of living across the board. This, of course, has worldwide implications as well, adversely affecting U.S.

Sponsor curriculum development

As corporations assess key skills required over the next several decades, they should cooperate with high schools and junior high schools to develop programs that breed interest and proficiency in these areas. Corporations can even sponsor extracurricular activities such as science, computer or speech clubs that would reproduce real-life situations. Exposure, experience and excitement about the field can grow together.

Reward those who graduate

Corporations can offer guaranteed part-time employment to students who agree to remain in school and pursue courses preparing them for careers in their chosen field. Students perceive an incentive to stay in school and to experience a variety of disciplines.

Support employee involvement in school activities

Corporations should encourage executives to spend time with students in the classroom. The man hours forfeited would be repaid many times over. For students, school becomes a more interesting environment with clear attachments to the outside world. At the same time, the company builds a close relationship with young people with roots

The words are those of Jonathan Seybold, perhaps the most respected voice in desktop publishing. His newsletter, *The Seybold Report*, reaches some 200,000 publishers—of whom we estimate 199,990 have never even tried a NeXT™ Computer.

Certainly, then, Mr. Seybold's words weren't calculated to gain favor among his readers. We suspect a far simpler motive: honesty.

The NeXT machine has caused many to believe that it was designed

graphics—along with expansive libraries of fonts and art.

The NeXT Computer streamlines the entire publishing process. FrameMaker® software combines writing, graphics and layout tools in one publishing package. Which brings an end to the tradition of forever bouncing between programs, “importing” and “exporting” as you go.

And, thanks to true multitasking, you can instantly access other applications.

The NeXT Digital Library,™ for

“THE BEST COMPUTER FOR PUBLISHING EVER MADE.”

exclusively for publishing. Not a bad theory, considering the evidence.

To begin with, the NeXT Computer is the first pure PostScript® machine. You can work on-screen with the hundreds of fonts in Adobe's type library. You can output to any PostScript device, be it laser printer, slide maker or the highest quality professional typesetter. And what you see on the display is precisely what will print.

As the rest of the industry explores ways to accomplish this feat, in a year at best, only the NeXT Computer can do it today.

In addition, the quality of the image itself is raised dramatically.

The NeXT MegaPixel Display provides a huge workspace, with sharpness and detail you haven't seen on a computer before. The NeXT Laser Printer, at 400 dots per inch, offers over 75% greater resolution than the current 300 dpi standard.

Ours is also the only system to offer optical storage as a standard feature. A single optical disk (256 megabytes) lets you store and transport multiple versions of long documents, rich in

example, is always at hand. It includes entire books, such as Webster's Ninth New Collegiate Dictionary® and Collegiate® Thesaurus. Or archives of your past work, in which you can pinpoint text or graphics in seconds, to copy into new documents.

NeXT Mail makes publishing a truly collaborative process. Unlike ordinary e-mail, it lets you send and receive messages that include text, graphics, voice, even entire documents. Never has there been a more effective way to locate information, receive comments and get approvals.

And, as *Publish!* magazine recently reported, the NeXT Computer “offers a staggering price advantage” when compared to personal computers configured for desktop publishing.

To receive our publishing brochure, call 800-848-NeXT. While you're on the line, ask for the location of your nearest Businessland Center. There, you can get some hands-on experience with the world's most sophisticated desktop publishing system.

And get a quote on a system all your own.



"A.M.E. sets New Security Standard"

MacWEEK 1/16/90



Security & Virus Protection

Logs software & hardware activities

Protects against illegal copying

Prevents launching of unauthorized programs

Multiple levels of Users with individual/group access controls

Specific Desk Accessory Control

Multiple encryption/password options

A.M.E. is an integrated security program. Whether your concerns are managing a confidential government project, maintaining order on a Mac™ used by many people, or just preventing your child from destroying financial records, A.M.E. has a solution for you. It runs quietly in the background and is always there to protect you. The easy-to-use interface lets you set up the Mac with just the kind of security you require.

Access Managed Environment

Call today for a Free Brochure 800 359-4920

Casady & Greene, Inc.

P.O. BOX 223779 • CARMEL, CA 93922 • 408 • 624 • 8716

Circle 16 on reader service card.

MACWORLD

ADVERTISING SALES

Vice President/Director of Advertising Sales
Patricia Navone (415/243-0505)

Western Advertising Manager William P. Peck
(415/243-0505)

Senior Account Manager/No. California (San Francisco) Penny Rigby (415/243-0505)
No. California (San Jose) Cherie La France
(415/243-0505)

Northwest Regina T. Salaices (415/978-3155)
Sales Associate Danny Linden

So. California Paul Dudas (714/250-1307)

Southwest, Texas Cathi Tucker (714/250-1307)

Sales Associate Marsha Bowers

Midwest Shannon Dolan (312/827-4477)

Sales Associate Sandy Mussato

Eastern Advertising Manager Bill Thompson
(201/967-1350)

Mid-Atlantic Annette Bremer (201/967-1350)

New England Joan Flynn (508/879-0700)

Southeast Kathy Isaacs (404/394-0758)

Telemarketing Manager Beverly Schneider
(415/243-0505)

Macworld Catalog Carol Felde, Niki Stranz
(415/978-3152; 415/978-3105)

Vice President/Marketing and Circulation Dan Orum

MARKETING

Marketing Associate Susan Carroll

Marketing Associate Lisa Espinoza

Marketing Associate Kimberlee Luedee

Marketing Associate Randy Schneiderman
(415/243-0505)

CIRCULATION

Circulation Manager Lindsay Davidson

Fulfillment Coordinator Evelyn Adenau

Promotion Coordinator Lori Hitchcock

Circulation Assistant Catherine Huchting

Single-Copy Sales Director George Clark

Single-Copy Sales Rep Martin Garchar

RESEARCH

Director of Research Gary Rocchio

Project Coordinator Guy Tasaka

ADMINISTRATION

Director of Finance Vicki Peilen

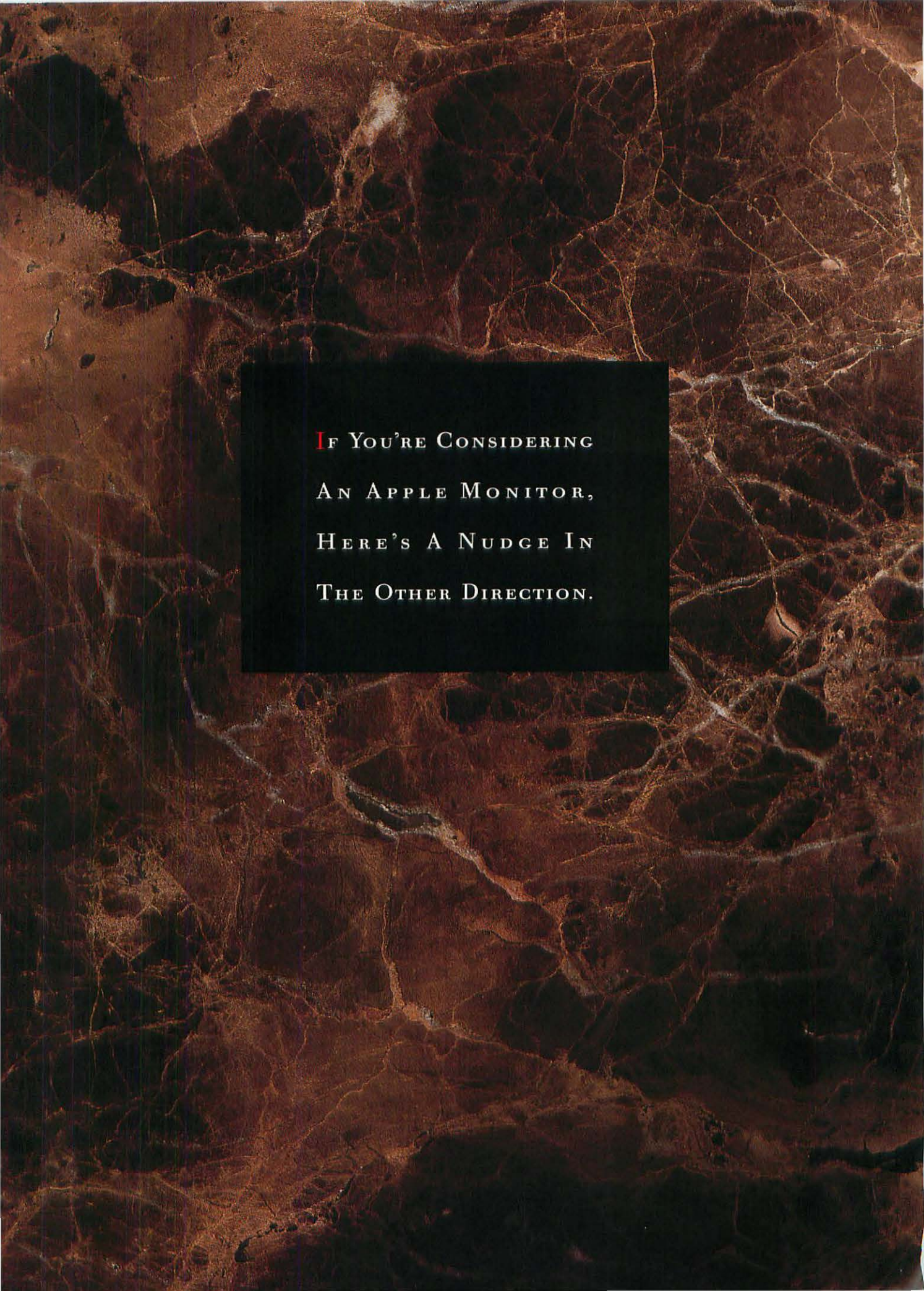
Corporate Business Manager Christina W. Spence

Accounting Manager Pat Murphy

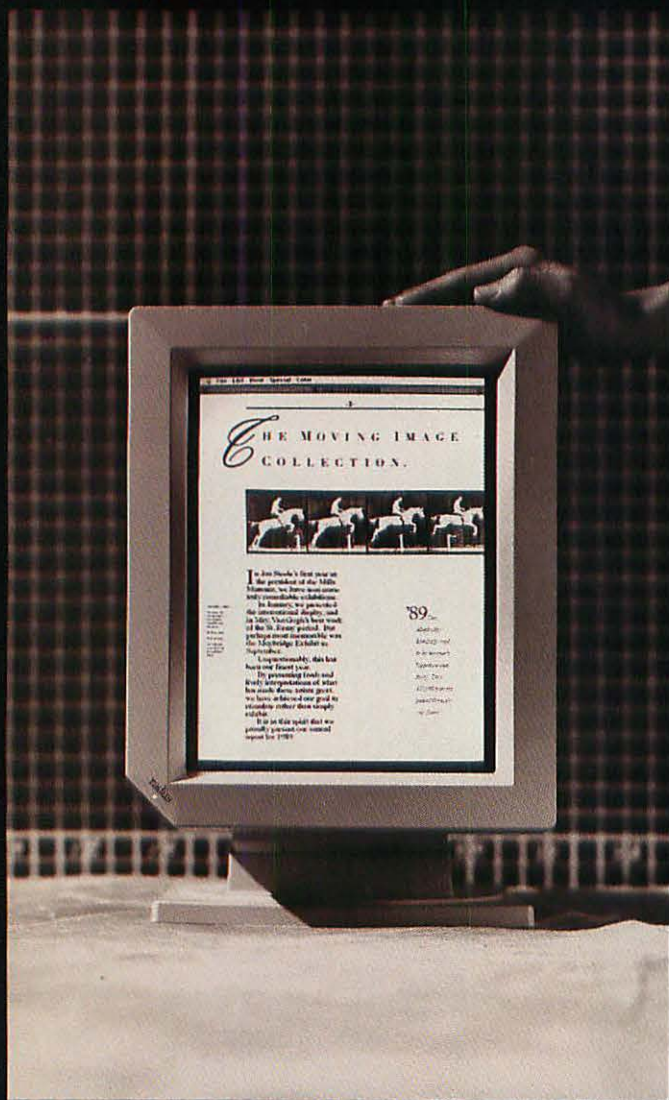
Director of Human Resources Shelly Ginethal
Information Systems Manager Walter J. Clogg

Founder David Bunnell

Founding Editor Andrew Flugelman 1943-1985

The background of the entire image is a piece of marbled paper with a complex, organic pattern of dark brown, black, and lighter tan veins. In the center, there is a solid black rectangular box containing white text.

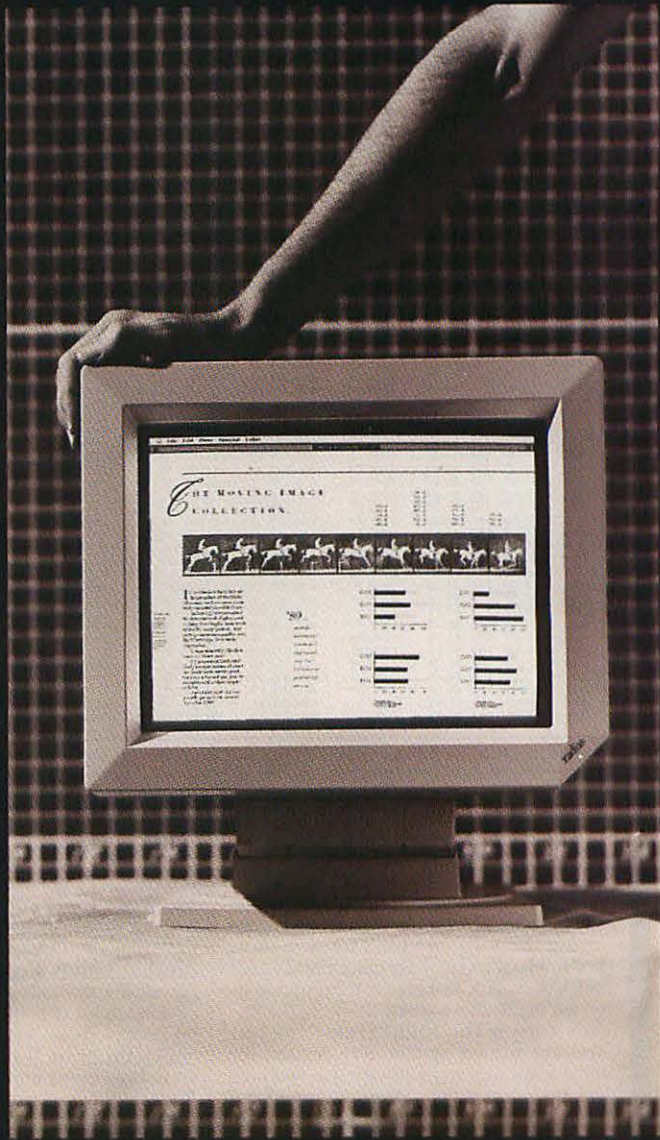
IF YOU'RE CONSIDERING
AN APPLE MONITOR,
HERE'S A NUDGE IN
THE OTHER DIRECTION.



Once again, Radius turns display technology on its ear. Introducing Pivot™, the first display that goes from portrait to landscape with only a gentle push. ● The new Pivot is the first display that changes orientation, in real time,

to match the format of your project. For example, when you're writing a manuscript, you can see a full page in portrait position. And when you switch to spreadsheets, you can rotate Pivot to view all twelve months. ● Four

radius



*If you live outside the United States, call 408-434-1010 for the name of a Radius International Distributor.
© 1990 Radius Inc. Radius, the Radius logo, and Radius Pivot Display are trademarks or registered trademarks of Radius Inc.

levels of gray are furnished, with upgrades to

16 levels for near-photographic quality images.

Ideal for graphic design and desktop pub-

lishing. ● Pivot is compatible with virtually

every Macintosh application and may be used

Circle 46 on reader service card

with either the SE/30 or Macintosh II family.

● To find your nearby Radius reseller,

phone 1-800-227-2795*. Then, before you buy

a display for your Macintosh, check out another

amazing way to look at things from Radius.

You could have turned a \$50,499 investment into \$2,520,603 in 5 years with our Index Program.

Type	Rate	Quant	Purch Price	Cost	Sell Date	Sell Price	Comma /Sell	Today's Value	P/L
Puts	12/28/84	100	\$3.00	\$209.25	\$30,269.25	01/09/85	\$4.25	\$226.25	\$42,272.75
Calls	01/28/85	100	\$4.30	\$230.00	\$43,980.00	02/11/85	\$5.63	\$267.50	\$25,982.50
Puts	03/12/85	100	\$2.80	\$209.25	\$28,959.25	03/19/85	\$4.00	\$218.75	\$39,781.25
Calls	04/26/85	100	\$2.50	\$209.25	\$35,209.25	05/20/85	\$6.75	\$301.25	\$19,196.75
Calls	06/26/85	100	\$2.30	\$209.25	\$23,959.25	07/01/85	\$3.12	\$209.25	\$31,941.75
Calls	07/18/85	100	\$5.90	\$249.75	\$59,249.75	07/13/85	\$3.75	\$211.25	\$37,288.75
Puts	08/13/85	100	\$3.25	\$209.25	\$32,709.25	08/26/85	\$2.75	\$209.25	\$27,290.75
Puts	09/16/85	100	\$2.25	\$209.25	\$22,709.25	09/26/85	\$2.50	\$209.25	\$24,790.75
Calls	11/05/85	100	\$4.80	\$245.00	\$45,995.00	12/18/85	\$19.63	\$697.50	\$146,567.50
Calls	01/27/86	100	\$3.25	\$209.25	\$32,709.25	03/04/86	\$10.88	\$425.00	\$108,525.00
Calls	03/12/86	100	\$4.75	\$241.25	\$47,741.25	04/29/86	\$9.63	\$387.50	\$95,862.50
Calls	05/21/86	100	\$4.50	\$232.75	\$45,233.75	06/09/86	\$9.75	\$391.25	\$97,105.75
Calls	08/06/86	100	\$4.13	\$222.50	\$41,472.50	09/05/86	\$12.75	\$481.25	\$127,018.75
Calls	09/17/86	100	\$4.50	\$232.75	\$45,233.75	11/13/86	\$6.88	\$305.00	\$68,442.00
Calls	11/25/86	100	\$4.13	\$222.50	\$41,472.50	12/19/86	\$4.88	\$245.00	\$48,505.00
Puts	01/02/87	100	\$2.30	\$209.25	\$23,959.25	01/05/87	\$1.00	\$209.25	\$3,790.75
Calls	01/08/87	100	\$6.75	\$301.25	\$67,801.25	03/03/87	\$29.63	\$987.50	\$295,262.50
Calls	03/05/87	100	\$3.50	\$209.25	\$35,209.25	03/12/87	\$2.94	\$209.25	\$29,165.75
Calls	03/20/87	100	\$4.75	\$241.25	\$47,741.25	04/07/87	\$8.25	\$346.25	\$82,153.75
Calls	05/06/87	100	\$3.75	\$211.25	\$37,711.25	05/08/87	\$2.25	\$209.25	\$22,250.75
Puts	05/19/87	100	\$4.00	\$245.00	\$45,995.00	05/21/87	\$7.50	\$322.75	\$74,476.25
Calls	06/17/87	100	\$4.25	\$226.25	\$42,726.25	07/16/87	\$8.25	\$346.25	\$82,153.75
Calls	07/31/87	100	\$3.13	\$209.25	\$31,459.25	08/06/87	\$5.00	\$240.75	\$49,751.25
Calls	08/10/87	100	\$5.88	\$275.00	\$59,025.00	08/26/87	\$13.69	\$509.45	\$136,390.55
Puts	09/09/87	100	\$4.30	\$230.00	\$43,980.00	09/10/87	\$3.63	\$209.25	\$36,046.75
Puts	10/08/87	100	\$3.00	\$209.25	\$30,269.25	10/20/87	\$9.75	\$391.25	\$97,105.75
Puts	11/10/87	100	\$5.00	\$245.00	\$50,245.00	11/11/87	\$5.69	\$269.25	\$56,605.63
Calls	11/13/87	100	\$3.50	\$226.25	\$35,209.25	11/24/87	\$2.30	\$209.25	\$23,940.75
Calls	12/15/87	100	\$3.13	\$209.25	\$31,459.25	12/24/87	\$8.50	\$352.75	\$84,646.25
Calls	02/11/88	100	\$2.25	\$209.25	\$22,709.25	03/17/88	\$7.63	\$327.50	\$75,322.50
Puts	03/25/88	100	\$3.30	\$232.50	\$33,959.25	04/05/88	\$5.63	\$267.50	\$55,982.50
Calls	05/16/88	100	\$4.63	\$237.50	\$46,487.50	05/16/88	\$5.25	\$256.25	\$52,243.75
Calls	05/28/88	100	\$4.25	\$226.25	\$42,726.25	06/27/88	\$15.00	\$540.75	\$141,451.25
Calls	08/01/88	100	\$4.00	\$245.00	\$40,218.75	08/05/88	\$2.63	\$209.25	\$26,040.75
Puts	08/10/88	100	\$4.00	\$245.00	\$40,218.75	08/24/88	\$7.38	\$320.00	\$73,430.00
Puts	10/05/88	100	\$3.25	\$209.25	\$32,709.25	10/10/88	\$2.00	\$209.25	\$19,790.75
Calls	10/10/88	100	\$5.50	\$253.75	\$55,263.75	10/22/88	\$9.50	\$383.75	\$93,552.50
Calls	01/09/89	100	\$7.13	\$312.50	\$71,562.50	02/09/89	\$18.50	\$630.75	\$179,361.25
Calls	02/17/89	100	\$6.25	\$286.25	\$62,786.25	02/22/89	\$5.25	\$256.25	\$25,243.75
Puts	02/23/89	100	\$3.75	\$211.25	\$37,711.25	03/02/89	\$4.88	\$245.00	\$48,505.00
Calls	03/06/89	100	\$5.63	\$267.50	\$56,517.50	03/19/89	\$8.38	\$350.00	\$83,400.00
Calls	03/29/89	100	\$6.30	\$290.00	\$64,040.00	05/02/89	\$10.75	\$421.25	\$107,076.75
Puts	05/10/89	100	\$2.63	\$209.25	\$26,459.25	05/12/89	\$1.75	\$209.25	\$17,290.75
Calls	07/06/89	100	\$5.75	\$271.25	\$57,771.25	08/14/89	\$25.00	\$673.25	\$249,326.75
Calls	08/24/89	100	\$3.63	\$232.50	\$36,459.25	08/25/89	\$8.13	\$342.50	\$80,907.50
Calls	09/29/89	100	\$4.13	\$222.50	\$41,472.50	10/09/89	\$11.25	\$436.25	\$112,063.75
									\$2,520,603.00

76.09% Accurate: Above is a chart of actual OEX trades from December 28, 1984 to October 9, 1989, based on the signals generated by the **Right Time-Index Program™**. By following the signals generated by the program, the rules in the manual and starting with just a small amount of capital (\$50,000) your profits would have been over \$2,500,000.00.

The **Right Time™** computerized trading system was developed by an expert portfolio manager for his own personal use. Over the last nine years of in-market use the software has been perfected and made easy to use. Now it's available for any smart trader who wants to make quick profits from quick decisions. Just look at the profits generated in the above chart!

Not only is **The Right Time™** the best decision support system ever devised for traders, it's the **only** software that analyzes volume/price, support/demand, and global market trends - all at the same time.

Amazingly Precise.

The **Right Time™** programs run on IBM (and compatible), Apple II and Macintosh personal computers. The software is easy to use, amazingly precise, and very, very clear in its signals.

You can retrieve and update signals for your stocks, commodities, indices or funds from Dow Jones, Warner, Signal, DBC or the Radio Exchange in less than five minutes per day. What's more, you can play "What If" games and have results in about one second.

Results: Winning Trades.

There are seven **Right Time™** programs available to help you make the right decisions at the right time.

Stock Program: "The program is amazing. Profitable trades have developed out of nowhere!" M.C., brokerage firm vice president.

Index Program: "Computer whiz finds program for success. This program really works." A.G. columnist.

Futures Program: "Very profitable with four out of five winners. Paid for itself the first trade." B.L., advisor.

Mutual Funds Program: "Accurately picked my last seven profitable trades. I couldn't trade without it." L.S., individual investor.

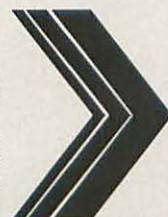
Stock Program/Long Term: "Exactly what I've been waiting for from T.B.S.P. Perfect for our more conservative clients." G.M., stockbroker.

Day Trading Program/Index and Futures: "The Day Trading Programs are sensational." P.S., investor.

For More Information.

Call (714) 548-2874 or write for our free twenty page brochure. Each of our end-of-day programs costs \$499, any two \$899, any three \$1299, any four \$1599 or all five for just \$1899. Demonstration programs are available for \$59 (each) - includes manual.

Our Day Trading Programs are priced at \$999 each or both for \$1799.



T.B.S.P. INC.

The Better Software People
620 Avocado Ave.
Corona Del Mar, CA 92625
(714) 548-2874

© T.B.S.P. Inc. 1990

Hours: 9am - 5pm M-F Pacific Time

Circle 153 on reader service card.

MACWORLD

HOW TO CONTACT MACWORLD

Subscription Services

For subscription service questions, call 800/234-1038, 800/525-0643, or 303/447-9330, or write Subscriber Services, P.O. Box 54529, Boulder, CO 80322-4529. To place new orders, call 800/288-6848.

Macworld in Microform

Macworld is available on microfilm and microfiche from UMI, 300 N. Zeeb Rd., Ann Arbor, MI 48106-1346, 313/761-4700.

Back Issues of Macworld

Write to: Back Issues of Macworld, 144 Townsend St., San Francisco, CA 94107; \$6 per issue (\$20 overseas). Prepayment in U.S. funds necessary.

Macworld Editorial

Mail or Courier Macworld Communications, Editorial Dept., 5th floor, 501 Second St., San Francisco, CA 94107; 415/243-0505.

AppleLink: Macworld1 Connect: Macworld1 CompuServe: 70370, 702 Fax: 415/442-0766

Letters to the Editor All your written comments, questions, and suggestions regarding any aspect of the magazine are read by our editor. We reserve the right to edit all submissions; letters must include your name and address. Direct all correspondence (by mail or electronically) to: Letters to the Editor.

Questions and Quick Tips Direct questions or tips on how to use Mac computers, peripherals, or software (by mail or electronically) to: Quick Tips, Lon Poole.

Consumer Advocate Been burned? Really steamed? Direct your concerns (by mail or electronically) to: Conspicuous Consumer, Deborah Branscum.

New Products and Updates Direct press releases and product announcements (by mail or electronically), and shrink-wrapped software upgrades (by mail or courier) to: New Products Editor.

Editorial Calendars For a copy of Macworld's editorial calendar, direct requests (by mail) to: General Information, Editorial Dept.

Reprints and Permissions For written permission to quote or reproduce material from Macworld, direct requests (by mail) to: Reprints and Permissions, Editorial Dept.

Writing for Macworld Please do not send us unsolicited manuscripts. If you're interested in writing for Macworld, send a stamped, self-addressed envelope along with a request for our writer's guidelines. Direct (by mail) to: Writer's Guidelines, Editorial Dept.

POSTMASTER: Send address changes to Macworld, P.O. Box 54529, Boulder, CO 80322-4529. For dealer inquiries, call 800/621-5461, in California 800/521-8455. Editorial and business offices: 501 Second St., San Francisco, CA 94107, 415/243-0505.

Macworld is a publication of Macworld Communications, Inc. Macworld is an independent journal not affiliated with Apple Computer, Inc. APPLE, the APPLE LOGO, MAC, MACINTOSH, and MACWORLD are registered trademarks and MACLETTER is a trademark of Apple Computer, Inc. Printed in the United States of America. Copyright 1990 Macworld Communications, Inc. All rights reserved. Macworld is a member of IDG Communications, the world's largest publisher of computer-related information. IDG Communications publishes over 120 computer publications in more than 40 major countries. Fourteen million people read one or more IDG Communications publications each month.



The advertisement features a Shiva NetModem V.32 modem at the top. The modem is a light-colored, rectangular device with a dark front panel. On the front panel, there are three status LEDs (power, telephone, and handshake) and the text "Shiva", "NetModem™", and "V.32". Below the modem is a stylized, colorful graphic of flames or smoke in shades of red, orange, and yellow. The main headline is "It's Going Where No High-Speed Modem Has Gone Before." in a large, serif font. To the left of a table, there is a paragraph of text describing the modem's features. The table itself has five rows and two columns, with the first column listing features and the second column showing a rating of five stars. To the right of the table, there is another paragraph of text. At the bottom, the product name "NetModem V.32" is displayed in a large, stylized font, followed by "by Shiva" and the slogan "We're Putting Networks To Work®". The address "155 Second St., Cambridge, MA 02141" and a disclaimer "All product names are trademarks of their respective manufacturers." are at the very bottom.

Shiva

NetModem™

V.32

It's Going Where No High-Speed Modem Has Gone Before.

There's nothing more advanced for Macintosh networks than the new high-speed NetModem V.32. Because the NetModem V.32 pushes performance to the limit. Just plug one into your network and every connected Mac can communicate at any speed up to a sizzling 9,600 bps with full V.32 compatibility. The NetModem V.32 is easy to use, even if you've never seen a modem before, with menubar 'LEDs' and familiar modem sounds fed back to your Mac as your call progresses. It's also economical, saving the expense of a dedicated Mac, multiple modems and extra phone lines – not to mention excessive telephone and online charges.

SPEED	★★★★★
NETWORK SHARING	★★★★★
REMOTE BRIDGING	★★★★★
EASE OF USE	★★★★★
DIAL-IN NETWORK ACCESS	★★★★★

It even lets you dial in to your network from a remote site to access files, use TOPS®, AppleShare®, E-mail®, printers or any other network resource. And it lets any Mac on your network access a remote network thousands of miles away, creating a powerful, high-speed wide-area internetwork. The Hayes-compatible NetModem V.32 comes with Internet Manager software that lets you create network zones, control traffic, restrict access between zones – even check the location and status of every device in the system. The NetModem V.32 is setting a whole new standard. For more information, call Shiva at **1-800-458-3550**.

NetModem V.32
by Shiva

We're Putting Networks To Work®

155 Second St., Cambridge, MA 02141

All product names are trademarks of their respective manufacturers.

Wanted For Murphy

According to Murphy's Law, if a floppy disk can fail, it will. Usually after you put a 90-page document on it.

That's why you should use 3M diskettes. They're built to make things go right for a change. With our

exclusive formulation and Mark Q Manufacturing Process, they break Murphy's Law millions of times a day. Year in and year out.

And our engineers have taken the same fanatic approach with all our

er Breaking y's Law.



data storage products: diskettes, data cartridge tapes, computer tapes and optical disks. So when you get

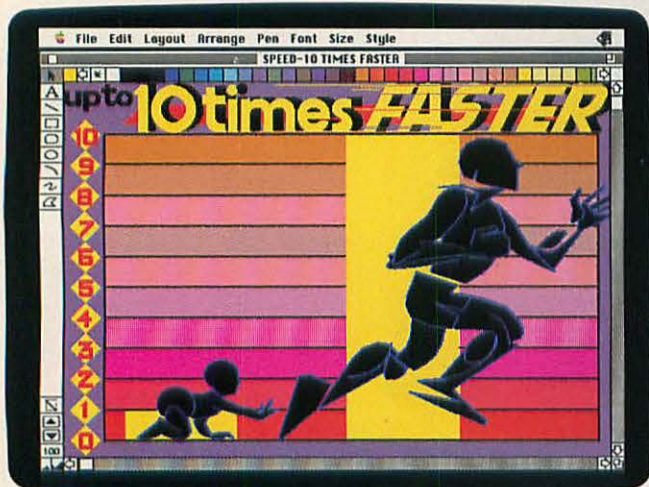
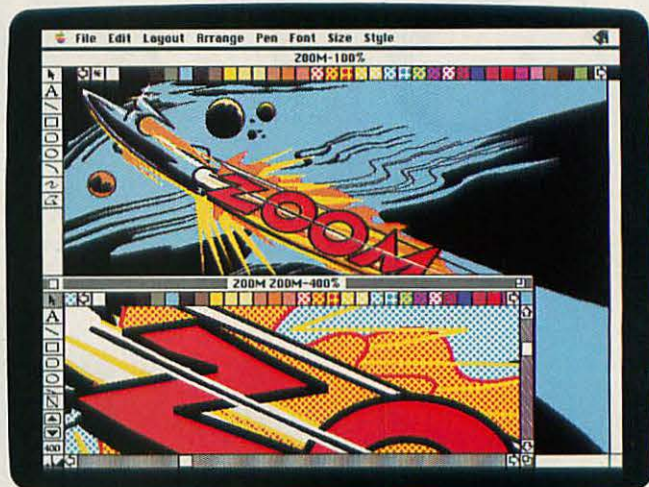
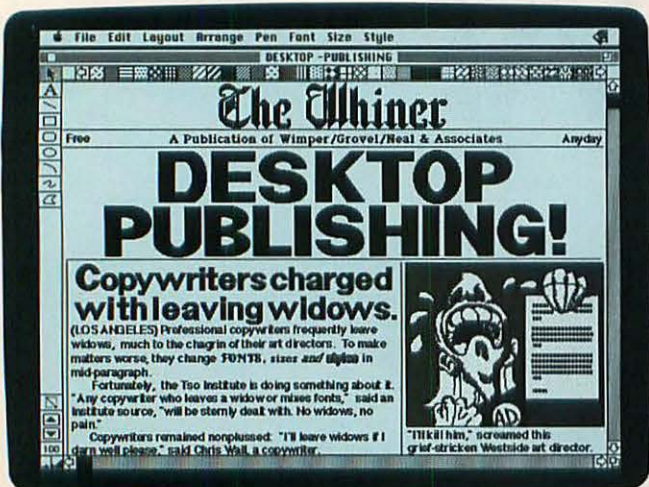
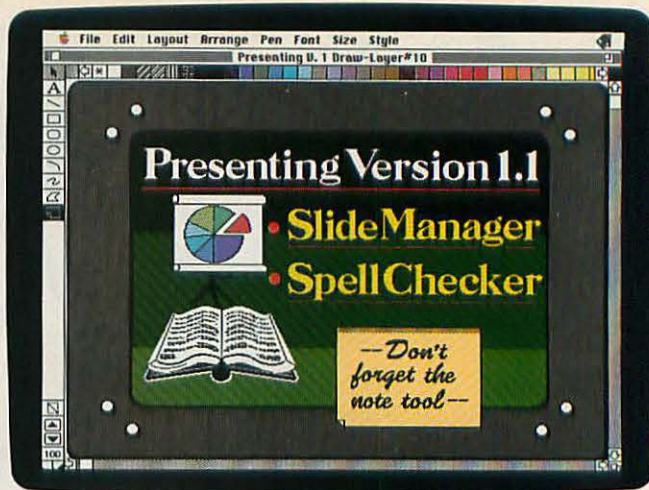
down to it, there are only two choices.

Use 3M diskettes and break Murphy's Law every day of the week. Or use something else. And give Murphy's Law a chance to break you.

For more information about diskettes, call 1-800-888-1889, ext. 10.

Circle 402 on reader service card

3M



Nobody reads legal type, either. But try convincing our lawyers of that. © 1989 Claris Corporation. All rights reserved, 5201 Patrick Henry Dr., Santa Clara, CA 408-987-7000. Claris is a trademark and MacDraw is a registered trademark of Claris Corporation. For the location of the nearest Claris dealer, call 408-727-8227. In Canada, call 800-668-8948.

Nobody reads copy anyway. MacDraw® II.

Circle 496 on reader service card

CLARIS™



MAC BULLETIN

Adobe Wins Font Copyright

Adobe has won the copyright for a font based on its being an executable program that runs under PostScript, marking the first time the U.S. Copyright Office has acknowledged that a digital font can be a program. According to Adobe president John Warnock, U.S. law does not recognize font design as intellectual property, which prevents font designers from copyrighting fonts. But computer programs are protected. Warnock was uncertain how the changes would affect pricing and licensing arrangements for fonts.

Aldus Likely to Acquire Silicon Beach

At press time, Aldus representatives were in San Diego poring over Silicon Beach's books after the two companies signed a letter of intent for Aldus to acquire Silicon Beach. Representatives of both companies refused to comment on the future of Silicon Beach's products, which include SuperPaint, Super3D, Digital Darkroom, Dark Castle, and SuperCard, but Aldus has long been rumored to be interested in a low-end page-layout program, and Silicon Beach was about to ship its \$299 Personal Press.

Bon Mot about Word 4.0 Bug

Microsoft has just released Word version 4.0a to address problems with Word's management of imported PICT files; a bug occasionally corrupts PICT objects copied from Word back into their creating applications. The problem affects SuperPaint files (SuperPaint is bundled with Word); expressions created with Prescience Corporation's mathematical typography package, Expressionist; and possibly other applications. Version 4.0a also fixes a bug in Word's Calculate command. The upgrade is free to registered owners who require it. Contact Microsoft support at 206/454-2030.

SoftPC Adds Soft Peripherals

Insignia Solutions is upgrading SoftPC to emulate an IBM AT-class machine entirely in memory. SoftPC's EGA/AT Option Pack, which lists for \$199, also emulates an EGA video board, an 80287 math coprocessor, and a LIM board for expanded memory. The new version requires a Mac II-family machine or an SE/30. For more information, contact Insignia Solutions at 408/522-7600.

TypeStyler Goes Type 1

Brøderbund has announced TypeStyler version 1.01, which applies TypeStyler effects to Adobe Type 1 fonts. Brøderbund is testing Type 1 fonts from other

vendors as well. Version 1.0 could use only Type 3 fonts. The new version uses tools licensed from Pipeline Associates to convert Adobe Type 1 fonts to a format that TypeStyler can convert to SmoothFonts. The upgrade will be free to registered users who contact Brøderbund at 415/492-3200.

1stAid Abandons Virus Defenses

Anti-Virus Kit will no longer be upgraded to combat new computer viruses. 1stAid Software has written to all registered owners to explain its decision, calling the new virus WDEF a "second generation" virus designed to escape detection, and saying that without virus control in hardware, WDEF will spawn an "endless cycle of response/counter-response," like the battles over copy protection, as virus writers try to evade virus-detection programs.

Radius Shows 21-Inch Gray-Scale Monitor

Radius recently unveiled its TPD/21, a 21-inch monitor that can display two full pages of a document side by side. Compatible with both the Macintosh family and the IBM PC/AT and its equivalents, the TPD/21 provides either monochrome or 8-bit gray-scale display, depending on the controller board used with it. For the Macintosh, the monitor's resolution is 1152 by 882 pixels, or 74 pixels per inch. Its refresh rate is 71Hz. The TPD/21 is compatible with other Radius products, including the PrecisionColor Calibrator (works in gray-scale only), the Radius GS/C Interface, the TPD Interface, and Radius accelerators. The monitor is available now at a suggested list price of \$1795, which includes RadiusWare software. Radius also reduced the list price of its Macintosh TPD Interface by \$100, to \$595. For more information, call Radius at 408/434-1010.

Adding Color Vision

Digital Vision has begun shipping a color version of its ComputerEyes video digitizer for the Mac II series. Called the ComputerEyes Professional Series, the digitizer can capture either 8-bit or 24-bit images generated by any standard NTSC video source, including S-video frames from Hi-8 or Super VHS machines. The ComputerEyes Professional Series is a single NuBus board with a list price of \$449.95, including software. For more information, call Digital Vision at 617/329-5400.

MicroNet Offers DAT Tape, Erasable Optical Drive

Two high-capacity storage subsystems for the Mac, a *(continues)*



1.3GB DAT drive and a 600MB erasable optical drive, have recently begun shipping from MicroNet Technology. The DAT drive comes in a 5¹/₄-inch form factor and includes a SCSI controller. Called the Micro/DAT, it has an average access time of 20 seconds and retails for \$4295. The erasable optical drive, based on a Sony device, stores 300MB on each side of a single optical disk. Also equipped with a SCSI port, the Micro/Optical has an average access time of 95ms and a data-transfer rate of 7.4 megabits per second. The Micro/Optical drive retails for \$5295. For more information, call MicroNet at 714/837-6033.

Claris Takes Wingz

Claris has acquired access to core technology underlying the Wingz graphical spreadsheet that could fill in gaps in the Claris product line. Wingz has several capabilities that Claris could develop as separate applications or incorporate into its other applications, including 3-D graphing, the high-level programming language HyperScript, the spreadsheet engine, and SQL hooks for communicating with host minicomputer and mainframe databases. Claris officials declined to comment on their plans.

MitemView to Support 3270 Emulation

MitemView, a set of tools for building HyperCard front ends that enable Macs to communicate with minicomputers and mainframes, has two new "personality" modules. One supports Tri-Data's Netway gateways, which use a networked Mac to emulate a 3270 cluster controller; and the other supports the Avatar MacMainframe, a board that makes individual Macs appear as 3270 terminals to the mainframe. The MitemView 3270 modules list for \$495 each and require MitemView at \$995. Mitem has also announced a Tandem 6530 module at \$495. For more information, contact Mitem at 408/559-8801.

MultiClip 2.0 in Development

At press time, Olduvai's Clipboard-and-Scrapbook-enhancement utility, MultiClip 2.0, had just gone into beta testing. The new version adds support for naming and printing individual ClipFrames; pasting ClipFrames from a pop-up menu without opening MultiClip; and 32-bit color. Olduvai says the new MultiClip is faster, offers improved window management under MultiFinder, and sports a simplified interface. List price remains \$99. For more information, call Olduvai at 305/665-4665.

A Shell for Plugging Holes

Abbott Systems is developing a utility that runs special functions inside any application. For example, a list-sorter that sorts a column of names in a spreadsheet or a page-layout document, and a case-changer that corrects capitalization in a downloaded text file. An INIT launches the functions, which are similar to XCMDs. Abbott Systems will ship the still-unnamed product with a collection of functions and provide tools for third-party developers to write more. Com-

pany president Ken Abbott said pricing would be in the utility product range: "between \$50 and \$150." For more information, call 914/747-3116.

Faxgate Turns Macs Into Fax Servers

Solutions' Faxgate integrates E-mail with sending and receiving faxes over most Mac-compatible fax modems. Faxgate adds fax-serving capability to an E-mail server, intercepting outgoing E-mail messages, converting them to Group 3 fax format, and sending them out via fax modem. Incoming faxes are sent as E-mail messages to the recipient. Solutions is shipping a Microsoft Mail 2.0-compatible version and expects to add QuickMail compatibility in April. Faxgate lists for \$395 and requires Solutions' BackFax software at \$245. Faxgate includes five copies of MailMaker, an E-mail document-exchange utility like Solutions' SuperGlue. For more information, contact Solutions at 802/865-9220.

Liberty Ships Small 200MB Hard Disk

Liberty Systems is shipping a 200MB external hard disk that weighs 3 pounds and measures only 2 by 5 by 7 inches. Called the Liberty 200R, the \$1699 hard disk uses an 18ms Rodime mechanism and is internally terminated. An optional \$50 international power supply, which fits inside the case, works with power lines that provide from 90 to 300 volts and functions as a surge protector with U.S. voltages. For more information, call Liberty at 408/983-1127.

Varityper Builds PostScript Offerings

Varityper is shipping its modular Series 4000 PostScript imagesetter controllers, which can output to a 600-dpi plain-paper device or to 72-pica or 108-pica film devices at resolutions up to 3048 dpi. Varityper is also releasing Adobe PostScript fonts for its imagesetters and is converting its own type library to Type 1 format. For more information, contact Varityper at 201/887-8000.

RasterOps Announces TV Board, Introductory Offer

RasterOps recently announced the ColorBoard 364, which combines the capability of its 24-bit ColorBoard 264 graphics adapter with additional video features. The ColorBoard 364 accepts 24-bit color video input from any NTSC source and displays it in real time. The board can function as a frame grabber, sending digitized PICT files to disk at a rate of 30 frames per second. RasterOps is working on connections to HyperCard and SuperCard, and will provide add-on external hardware that will act as a TV tuner and cable TV connector. The introductory price of the ColorBoard 364 will be \$1500 until April 1, at which time the price will rise to \$1995.

The company also introduced the ColorBoard 208, an 8-bit version of its 24-bit ColorBoard 264, that can be upgraded to 24-bit color by adding one megabyte of video RAM. The ColorBoard 208, available now, lists for \$495. The upgrade will list for about \$400 from RasterOps, but users can also buy the VRAM from third parties. For more information, contact RasterOps at 408/562-4200. ■

Announcing The

Grappler[®] LX

Laser/24 Pin Printer Solution



- ✓ Leaves hair silky and bouncy
- ✓ Contains 100% oat bran
- ✓ A premium performance printer interface
- ✓ Cholesterol free
- ✓ Leaves no sticky film
- ✓ High speed, microprocessor driven, attractively priced

O.K. so it won't do all of the above, but it is new and improved, and it will let you use the printer you want with your Macintosh™. Announcing the *Grappler LX*, the latest advance in Macintosh printer interfacing! Over the past 9 years, the Grappler name has been synonymous with innovation and excellence. This tradition has now created the pinnacle of Macintosh printer compatibility and performance.

Faster Print Speed

We've optimized the speed and efficiency of the *Grappler LX* to insure that you get peak performance from your laser, inkjet, or 24 pin dot matrix printer. The *Grappler LX* adjusts to the printer in use to provide the best possible output in the least possible time.

Includes Free AutoInstaller!

To ensure quick, trouble-free installation, the *Grappler LX* includes a new AutoInstaller. Just point and click, and the *Grappler LX* will be ready to print from any Macintosh Plus, SE, SE/30, II, IIx, IIcx or IIfx computer.

Enhanced Printer Compatibility

The *Grappler LX* provides you with the freedom to choose which printer is used on your Macintosh. The *Grappler LX* supports any HP®-compatible laser printer, DeskJet™ or DeskJet Plus™, even Epson®-compatible 24 pin dot matrix printers! With virtually all printer technologies supported, the *Grappler LX* can serve your every interfacing need!

Grappler and Alphabits are trademarks of Orange Micro, Inc.; Macintosh and AppleTalk are trademarks of Apple Computer, Inc.; DeskJet and DeskJet Plus are trademarks of The Hewlett-Packard Co.; Adobe Type Manager is a trademark of Adobe Systems, Inc.



More Fantastic Fonts!

The *Grappler LX* includes five standard fonts. You'll be able to enhance documents and clarify correspondence with new emphasis and flair. You can now use Swiss, Courier, Dutch, Garamond, and Zapf Chancery Medium Italic in a variety of sizes. For large outline fonts of any style, use Adobe Type Manager™ (ATM) which is fully compatible with the *Grappler LX*.

Other Orange Micro Printer Products

The *Grappler 9 Pin* provides owners of Epson-compatible dot matrix printers a cost-effective method of printing directly from the Macintosh. The *Grappler Spooler* lets *Grappler 9 Pin* and ImageWriter owners work while printing. For economy-minded Hewlett-Packard LaserJet and DeskJet Plus owners, the *Grappler LS* provides Macintosh printer compatibility. For additional fonts, try *AlphaBits*, a collection of seven popular typefaces.

With nearly 1 million Apple printer interfaces sold, Orange Micro sets the pace in compatibility solutions. Call a local Apple Authorized dealer or Orange Micro today to receive additional information or to order the *Grappler LX*.



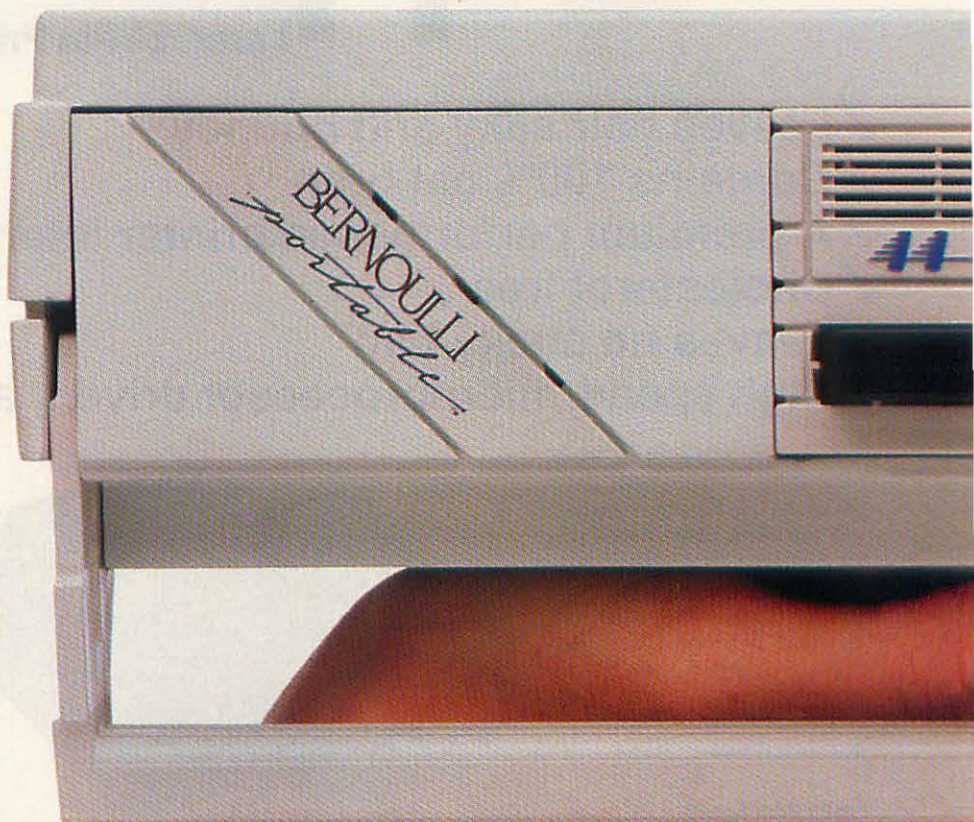
"10 Years of Innovation and Excellence"

1400 N. Lakeview Ave., Anaheim, CA 92807
(800) 223-8029, in CA (714) 779-2772

© Orange Micro, Inc., 1989

Circle 108 on reader service card

THE NEW BERNOULLI SECURITY FOR YOUR DATA



**BERNOULLI
MEANS SECURITY
FOR YOUR DATA**

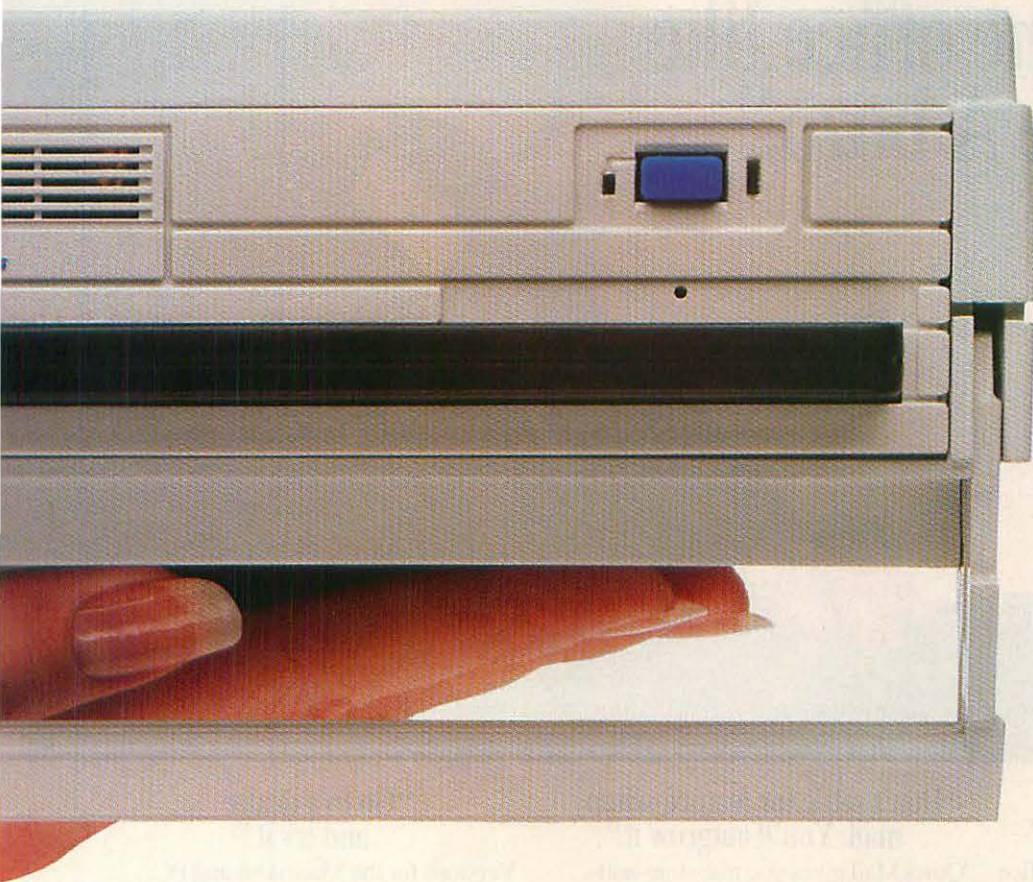
The portable
computing
world isn't
very forgiv-

ing. The moment you grab
your portable computer
and walk out the door,
your data is at risk. One
bump. One wrong
step. One clever
thief. And your
valuable data
could be gone
forever. But
thanks to

the rugged, removable
design of the new Bernoulli
Portable 44 for Macintosh,
you'll never have to face that
prospect.

Engineered for the new Apple®
Macintosh Portable, the light-
weight, battery-powered Bernoulli
Portable protects data from the
shakes and jolts inherent in travel.
Unlike hard disks, patented Bernoulli
Technology® makes the Bernoulli
Portable virtually head-crash free. And
44MB removable Bernoulli Disks can with-
stand shocks of 1000Gs without data loss.

PORTABLE 44 MEANS NO IFS, ANDS, OR PLUGS.



Bernoulli Disks also allow you to remove your data from the drive and carry it separately and safely, in case your hardware is stolen or damaged. Beyond that, Bernoulli provides unlimited storage and backup capacity, with 22msec effective access time, and Reed-Solomon data protection that's 15 times more effective than that used on a typical hard disk.

As the leader in removable mass storage,



Iomega also has a complete line of single- and dual-drive 44MB Bernoulli products that offer the same benefits for Macintosh as well as IBM® users in desktop environments.*

So make sure your data arrives with you. Contact an Iomega representative or call 1-800-777-

6649 for complete specifications on the Bernoulli Portable 44 for Macintosh. And discover what it means to have secure data. No matter where you go.

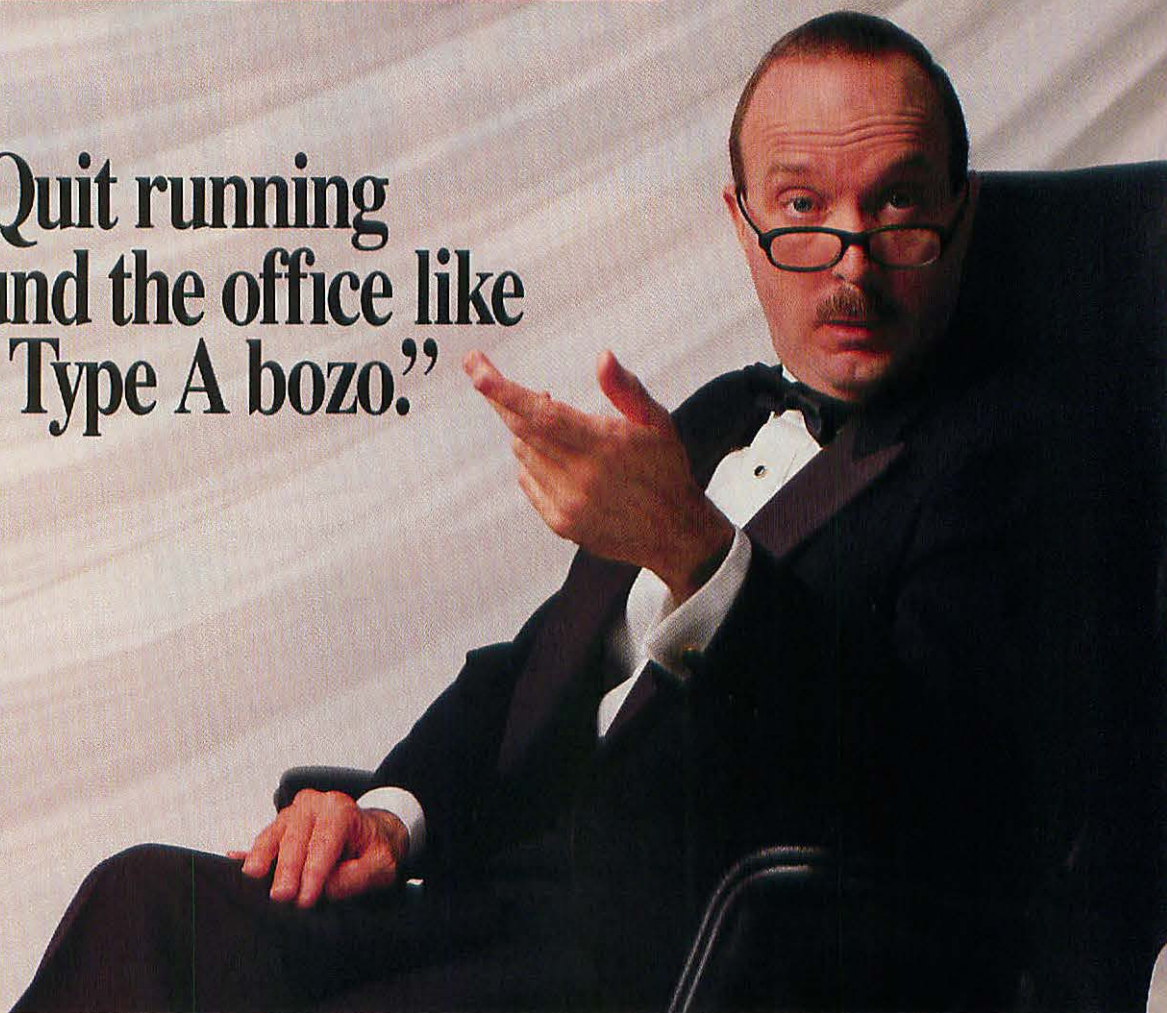
ΩMEGA
Never ending storage solutions.

*Bernoulli File Exchange software allows data migration between IBM and Macintosh. Bernoulli and Bernoulli Technology are registered trademarks and Bernoulli Means Security For Your Data is a trademark of Iomega Corporation. Apple and Macintosh are registered trademarks of Apple Computer, Inc. IBM is a registered trademark of International Business Machines.

Circle 260 on reader service card

Dr. Productivity Says:

**“Quit running
around the office like
a Type A bozo.”**



**“Don’t confuse activity with
productivity. Get QuickMail.”**

“In the time it takes to run across the office (to someone who’s not there anyway), you could have E-mailed your question, sent two more messages following up on different projects, answered several pressing questions that were E-mailed to you, then sent correspondence around the world. All without leaving your desk or your application. Ask anyone who’s used it: QuickMail is the biggest boost to productivity since fear.”

**“Don’t settle for hard-to-use
mail. No one will use it.”**

“QuickMail is simple, yet rich. People enjoy using it, so they use it more. Good. Whether you’re sending mail around your LAN or around the world, QuickMail makes it so fun and easy, people will cut down on time spent playing games, and get some real work done.”

**“Don’t settle for feature-wimpy
mail. You’ll outgrow it.”**

“QuickMail gives you true store-and-forward technology, real-time conferencing, custom forms, a mail log, wide area connectivity, access to mail from laptops or terminal packages, easy-to-use, automated gateways to the public networks like MCI Mail™, UNIX® mail, AppleLink® and more. Others talk about gateways. We’ve been delivering for months. (Beware of companies with Edsels in their ads.) You won’t outgrow QuickMail. Apple uses it. NASA uses it. Every major Macintosh® publication uses it. You can’t go wrong.”

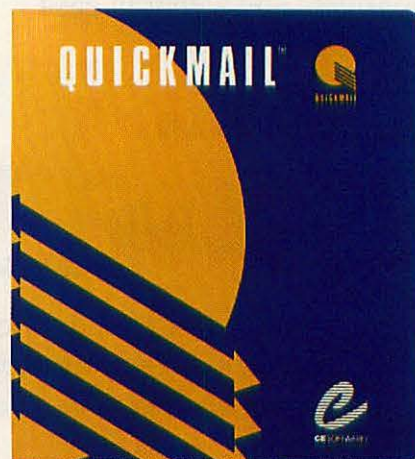
**“Want a second opinion?
Ask the critics.”**

“As we said before, CE Software’s QuickMail is the best electronic mail package on the Mac, and the latest updates have only increased its lead over Microsoft Mail and InBox.” MacWeek, 8/8/89

“Rather than exercising 20-20 hindsight, start out with QuickMail.” Dave Kosiur, Connections, July-August/89

**“Go to a dealer
and try it.”**

Versions for the Macintosh and PC.
Suggested retail price: Version 2.2,
10 user pak: \$499.95
Free literature and Where To Buy:
1-800-523-7638 Dept. CE32.





Macworld Goes Global

HOW WE MADE MACNOST IN THE USSR

S

BY JERRY BORRELL

omewhere on a side street of Moscow is an office where several people sit stooped over a couple of dim computer screens. The gray Russian winter still beats on the windows outside with a ferocity announcing its arctic origin. In the crowded room, thick with cigarette smoke, you can hear the clicking of a computer keyboard. And then, from the far side of the room, comes a little ding that proclaims a Macintosh has been turned on.

Yes, Macs in Moscow. The irony of it all. The computer for the rest of us is becoming the people's computer, although that expression is certainly passé in the Soviet Union of today. Now the Macintosh will be used to help produce *PC Mir* (*PC World*) in the Soviet Union.

Fifteen years ago I wandered Moscow's streets as a student, my footsteps dogged by a host of less-than-subtle observers. At times an older person would pull me aside and whisper that as long as the Soviet people had bread, shelter, and peace, things were all right. Twenty million countrymen had died in the Second World War and could I please tell everybody in America that what people in the Soviet Union wanted most was peace.

Argue what you will about the role the USSR has played—Evil Empire or tormented giant of Asia—the Mac can certainly help bring about change and



James L. Forquer, managing director of Apple Computer Singapore, shows associate features editor Cheryl England Spencer the monitor-testing site at Apple's factory (top). Macworld UK editor Peter Worlock and senior associate reviews editor Carol Person savor London's famous weather.



the greater possibility of peace to the Soviet Union. Last fall the State Department approved the export of Motorola 68000 processors to the Eastern Bloc. So with the help of Apple Computer's Michael Spindler, Kent Edquist, and others, I have contrived to deliver the editors at *PC Mir* from PC tyranny through the use of Macintoshes to produce their bimonthly publication. Moreover, I've instigated an upcoming article in *PC Mir* that tells readers how to get started with desktop publishing in Cyrillic. Last winter I discussed desktop publication of *PC Mir* with my Soviet colleague Michael Volodarsky, director of Information Computer Enterprises [ICE] of the USSR subsidiary of IDG, our parent company. I was concerned—torn by my old experiences with the deadening Soviet system and by heartrending television pictures of thousands of people standing at the Brandenburg Gate of Berlin, singing, dancing. Celebrating the finish of four decades of totalitarian society. In the end, it was no contest and I plunged headlong into helping acquire Macs for the USSR.

PageMaker is being localized for Cyrillic, and Apple is expected to deliver a Cyrillic Mac for the USSR as early as May. A Macworld-sponsored seminar scheduled for April will help U.S. developers enter the Soviet market. The first major exposition of U.S. computers in Moscow is scheduled for (continues)

Why Sensible Grammar™ is first in its class.

Now anything you write, from a business letter to an annual report, can be stronger and clearer. With *Sensible Grammar*™. A professional proof-reading program that uses artificial intelligence to check your punctuation, usage, phraseology and more.

Sensible Grammar scans your work for potential errors and automatically displays the sentences in which they appear. It explains what's wrong and even suggests corrections. Making changes is easy—a simple click of the mouse, and you can do anything from inserting proper punctuation to rewriting entire sentences using the built-in sentence editor. And your formatting information remains unaffected.

Sensible Grammar compares your text against a library of over 4500 phrases to identify informal, vague, racist, sexist and other faulty language. It catches embarrassing typographical errors like misused capitalization and repeated words, and alerts you to mismatched verbs and pronouns, needlessly long sentences and more. It even provides a readability analysis.

Sensible Grammar works with WordPerfect, Microsoft Word, Works, and Write, Apple/Claris MacWrite and MacWrite II, T/Maker WriteNow and text files. And it costs just \$99.95.

So get *Sensible Grammar*. And be the most effective communicator you can be.

Also available: *Bookends*™, the reference management database and bibliography preparation system (\$99.95).



Sensible Software, Inc.
335 East Big Beaver, Suite 207
Troy, MI 48063
(313) 528-1950

Circle 396 on reader service card.



Shigechika Takeuchi, president of Apple Computer Japan (right), and executive editor David Ushijima met in Tokyo.

July by cosponsors IDG and ICE.

There in the shadow of the Exposition of Achievements of the Soviet Economy will be Macintosh hardware and software as well as other personal computers. You could say that we are delivering technology to the Soviets that will help them repair their ravaged economy, and you may wonder whether that is something we should do. But as an observer with more than an academic knowledge of the Soviet people, I would argue that putting Macs into the hands of Soviet technocrats will accomplish what samizdat (publishing by hand—usually clandestine copies of banned books or political tracts) has only aspired to.

Growing Global Influence

It may be hard to believe that in the greater scheme of things, in matters of the world, the Mac and *Macworld* have some role to play. But over the last year we have both grown incredibly. The Macintosh, with its ease of localization and expanding success abroad, has become much more an international computer. As for *Macworld*, sister publications are springing up around the world. Foreign *Macworld*s have been created by our parent company in Sweden, Australia, the United Kingdom, Denmark, Taiwan, and Germany. And versions are planned for Norway, Finland, Japan, France, and other countries. They do not merely license our name, but actually involve sharing editorial and staff between publications.

Three years ago I began to envision an international sharing of editorial staff, building bridges between our offices in San Francisco and the 35 countries where IDG has subsidiaries.

Most magazines offer travel perks to journalists (one of the small benefits they're given to make up for the relatively little money they derive from their profession) but I hope to offer the *Macworld* staff something more—actual working knowledge of what is happening with the Mac in foreign countries, knowledge of publishing abroad, exposure to different cultures. In turn we're welcoming the editors of foreign *Macworld*s into our offices, and initiating them into the ways of Silicon Valley.

This is not merely an attempt to win the loyalty (and longevity) of young editors, for the Macintosh has expanded greatly worldwide. In 1989 nearly 35 percent of Apple's revenues were derived outside of the United States. Strong markets and communities of product developers are appearing in other countries. People abroad are doing things with the Mac that are of interest to our readers, and we have a long tradition of writing about them.

An Editorial Exchange Program

Senior editor Adrian Mello was chosen for the first exchange. Adrian traveled to Australia for three weeks in 1988 and went there again last fall. At that time, Adrian and I initiated remote network access to our AppleShare network server via Farallon's Timbuktu Remote, a setup that worked only sporadically in the first year. It was my goal to allow foreign editors to log on to our in-house network and access our stories, staff-created graphics, and E-mail.

The network capacity has grown—and *Macworld* UK was the first to log (continues)



Australian *Macworld* editor Osmund Lind Iversen (right) shows the sights of Sydney to senior features editor Adrian Mello.



Power Defined.



Power Realized.

Master the power of your software quickly as your own private tutor talks you through the software, step by step. With your hands on the keyboard, trying each new skill as it's explained, you'll learn quickly and thoroughly. Our interactive, hands-on tutorials are available for:

- Macintosh Basics
- Excel 1.5 or 2.2
- FileMaker II
- FreeHand 2.0
- HyperCard
- Illustrator 88
- PageMaker 3.0
- Persuasion 1.0 or 2.0
- Word 3.0 or 4.0
- Works 1.1 or 2.0

We offer beginning, intermediate and advanced tutorials for each of these software programs, so there's sure to be one that meets your needs.

Use the training that Apple uses for its own employees, and sells under its own name in Australia, Canada, New Zealand, and the United Kingdom.

If you're looking for a fast, convenient, affordable way to unleash the power of your software, call us at 1-800-TEACH-99 or 408-559-8635 and we'll send you a complete catalog — at no charge.



The old way to learn your favorite Macintosh software took days.
The Personal Training way takes just a few hours.

**PERSONAL
TRAINING
SYSTEMS**

Just like having a private tutor!

CALL 1-800-TEACH-99

Circle 42 on reader service card

To receive a free color catalog, mail to: Personal Training Systems,
828 S. Bascom Ave., Suite 100, San Jose, CA 95128 U.S.A.

NAME _____

COMPANY _____

ADDRESS _____

PHONE _____

OF MACS _____
MW4290

"Cream of

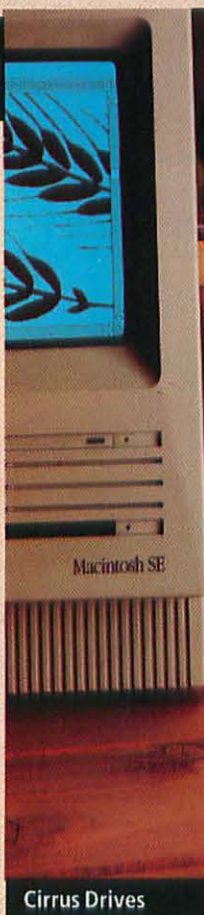
Do you compromise when you buy Apples?

To be chosen the best from a large crop of drives requires more than good looks. We've worked hard to make our drives the best, inside and out, because we know that your reasons for choosing a drive run more than skin deep.

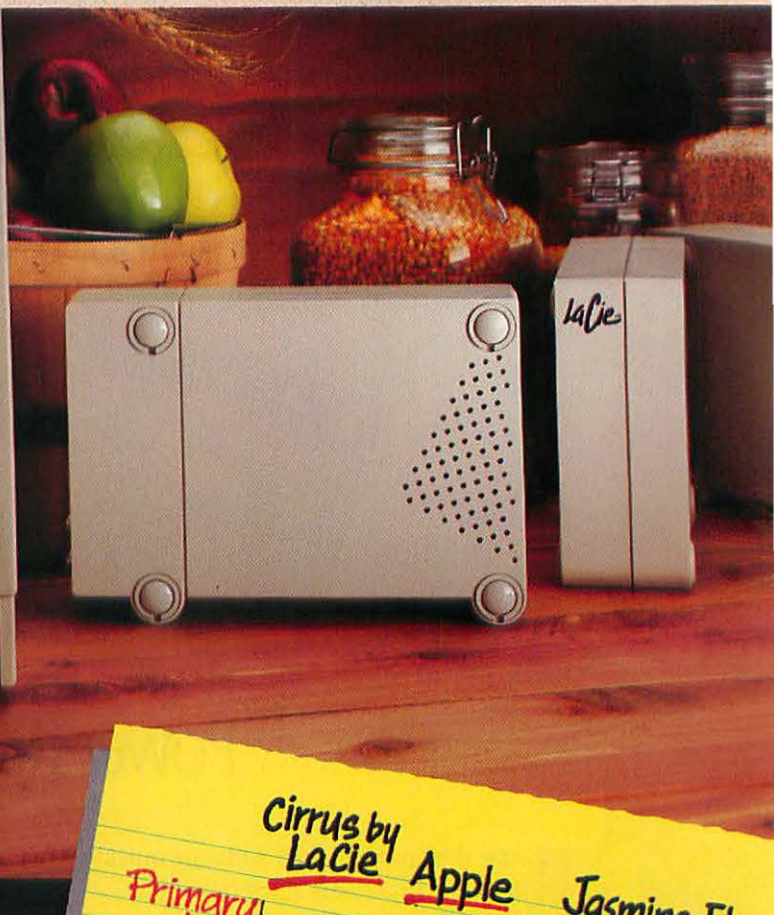
You should know that many other drive manufacturers' concern with quality stops with the case. At La Cie we don't think that's what value is all about. That's why we only use the best drive mechanisms and components — and we can prove it. We offer the fastest, quietest and smallest drives with the only five year manufacturer's warranty in the industry backed for five years by Quantum and Hewlett Packard.

Our attention to details makes us better. Silverlining™ is one more example of that. We wrote it and MacWorld highly recommends it: "La Cie drives include the best software we tested." What does it do? Silverlining performs formatting, interleave setting, programmable SCSI addressing, true partitioning, resizing of partitions without initializing, diagnostics, password protection, defragmentation and much much more. We're proud to point out that Silverlining was the first partitioning software available for the Macintosh.

Next time you purchase a drive be sure you experience the difference... experience the cream of the crop — La Cie. That's your right.



Cirrus Drives



Cirrus Drives

CAPACITY	CONNER ZERO FOOTPRINT	QUANTUM CIRRUS CASE
20 mb	\$399	
40 mb	\$479	\$579
50 mb		
80 mb	\$659	\$859
100 mb	\$759	\$959
120 mb		
170 mb		
200 mb	\$1159	
210 mb		
650 mb	Hewlett-Packard \$3099	

Includes Silverlining™ WingZ Test Flight, 5mb of public domain software. 30 day money back guarantee and a 5 year warranty for Quantum and Hewlett-Packard drives only.

FCC I.D. # GZJ-Cirrus

Cirrus by LaCie **Apple** **Jasmine Ehme**

Primary drive Quantum Quantum and Sony Varies Seagate

Speed Fastest Fastest

Noise Quietest 5DB louder 32% slower 32% slower

Size 2 3/4 x 6 x 9" 2 times larger 5DB louder louder

Warranty 5 years 90 days *1250/5yr. 1.6 times larger 1.4 times larger 2 years 2 years

MacWorld **Says** "Cirrus drives include an outstanding set of utilities"

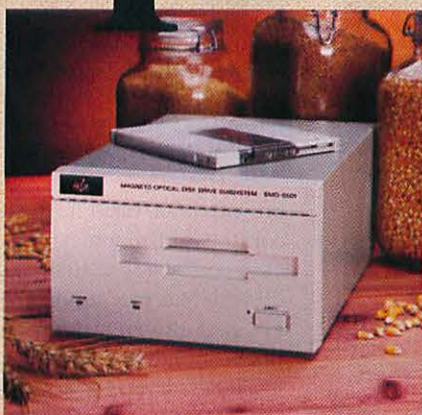
the Crop™

MacWorld, May 1989.

See You At
MacWorld Expo
Moscone Center
Booth #625



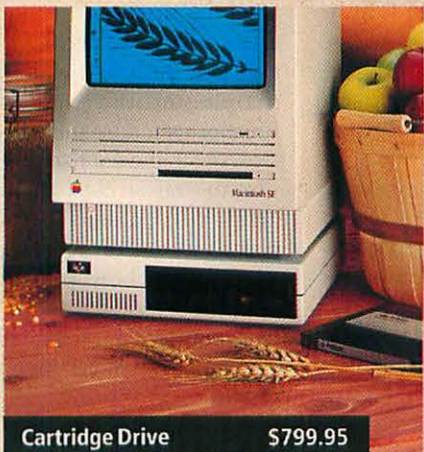
Modem for Portable Mac \$249.95



Magneto-Optical Drive \$3999.95



Phone Line Manager \$199.95



Cartridge Drive \$799.95



Color Scanner \$1799.95

Mass storage and productivity solutions for the Mac office.

La Cie Modems:

- 2400 baud Internal data and fax modem for the portable Mac — \$249.95.
 - 2400 baud Internal modem for Mac II — \$299.95
 - 2400 baud External modem — \$169.95
 - 9600 baud External modem — \$819.95
- Introductory offer! All modems include MacKnowledge™. La Cie's Silverplatter™ software and cables.

Cirrus 600MO Magneto-Optical Drive: 600 megabytes of erasable, removable data storage. Includes superior Sony drive mechanism, plus our own Silverlining and Silverserver software.

Phone Line Manager: Automatically routes and sends voice, FAX and modem calls over a single line. Answers incoming calls and connects to the correct device automatically or by caller-entered access codes.

Cirrus Removable Cartridge Drive: 45mb cartridges offer limitless storage with floppy convenience and hard disk speed. Includes La Cie's Silverlining and Silverserver software.

La Cie 911S Color Scanner: La Cie presents affordable true color scanning for the desktop. The high-powered 911S scans vivid color images at 300 DPI, 24 bits-per-pixel in 16.8 million eye-catching colors. The 911S also scans in precise 256 gray-scale mode as well as single-bit black and white. Versatility and performance make the 911S the affordable scanner you won't outgrow.

LaCie LTD.

Call Us Now! 1-800-999-0143

16285 SW 85th, Bldg. 306
Tigard, OR 97224, (503) 684-0143

Prices shown are cash prices and do not include shipping. Add 3% for VISA, Mastercard, 5% for American Express. Add 10% for rush handling. Cirrus, La Cie, Silverlining, Silverserver and Silverplatter are trademarks of La Cie, Ltd. Macintosh is a trademark of Apple Computer. Prices and specifications shown are subject to change without notice. Comparisons drawn from MacWorld reviews and company and manufacturers' specifications for 80 mb and/or 100 mb drives; call for further details. Product and company names are trademarks of their respective companies.

Circle 145 on reader service card

You'll Save a Mac BUNDLE!

...WITH \$ STRETCHING PACKAGES FROM AMERICA'S MAC SOURCE!

MacPlus \$1188.
CPU price with package

OUR POPULAR START-UP PKG.
• Mac Plus CPU
• 20 mb. Hard Drive
• 2.5 RAM
• Printer included!
Regular retail price \$3300
MacFriends discount price **\$1998**
Save over \$1300!

SE/30 COLOR PKG.
• Mac SE 30 CPU
• 5mb. RAM fast 80ns.
• 100mb. fast 19ms. H.D.
• 13" color monitor / 8 bit card
• 105 keybd w/Tempo II
Regular retail price \$8400
Our price **\$5388**
Save \$3000!

NEW! Includes 13" COLOR monitor!

SE/30 \$2988.
CPU price with package

Mac IIx \$3288.
CPU price with package

PRO-COLOR BUSINESS PKG.
• Mac II cx CPU
• 100mb. fast 19ms. H.D.
• 5mb RAM fast 80ns.
• 13" color monitor
• 24 bit color card
• 105 keybd w/Tempo II
Regular retail price \$8400
MacFriends discount price **\$5988**
Save over \$2400!

ASK ABOUT OUR BUSINESS LEASES ... AT AMERICA'S BEST RATES!

POWER USER'S COLOR PKG.
• Mac II ci CPU
• 100mb. fast 19ms. H.D.
• 8mb RAM fast 80ns.
• 13" Sony hi-rez color monitor with 24 bit card
• 105 keybd w/Tempo II
Regular retail price \$9400
MacFriends discount price **\$7188**
Save over \$2200!

Mac IIci \$4488.
CPU price with package

800 331-1322
Compare...Then Call Us Last!

Mac Friends
WE SPECIALIZE IN MAC ONLY!
SEE OUR ADS ON PAGES: 52, 250, 193

Leases, COD's Credit Cards OK!
All brand names shown are trademarks of their respective owners

Circle 58 on reader service card.



Editor-in-chief Jerry Borrell meets with Claris president Bill Campbell at the company's Sunnyvale, California, headquarters.

on with 9600-baud links and retrieve compressed graphics and text files. *Macworld* UK is actually a latecomer, the fifth Mac magazine to be launched in Great Britain and the largest Mac publication in that country, with over 33,000 readers. Our British sister publication is also the most active user of our network. Reviews editor Carol Person, assigned to work with British editor Peter Worlock, spent two weeks in January in the London offices. In April we will host a meeting of *Macworld* editors from around the world with the goal of sharing our electronic publishing technology on a wider basis. We await the time when the technology of image compression from companies such as Creative Circuits Corporation will allow us to send full-color images across the world just as we send half-megabyte graphics files at present.

Beyond the practical issues of communicating with international *Macworld*s, covering Apple Computer as it grows beyond \$5 billion in annual revenues has become a global task. Features editor Cheryl England Spencer's upcoming story on Apple's manufacturing required her to travel to Singapore to see one of the most automated plants in the world. Executive editor David Ushijima has been in Japan three times during the past year to follow the progress of Apple Computer in the Japanese market. Departments editor Deborah Branscum—fluent in Swedish—traveled to Sweden in March for an extended period of work with *Macworld* Sweden. After France, Sweden represents the largest market for Macs in Europe.

The editors of our sister publications in foreign countries give us eyes

and ears in Mac communities far beyond the reach of what we might be expected to know. The result? An extraordinary insight into uses of the Macintosh and how it will fare in international competition. And we've kept pace in the United States. We still maintain the largest editorial and design staff dedicated to covering the Mac. With over 375,000 subscribers, *Macworld* has grown to more than the circulation of the next two largest dedicated Mac publications combined. By the end of the year some issues will have more than 400,000 subscribers, making *Macworld* the fifth-largest computer magazine in the world. And as many as an additional 100,000 Mac users read our editorial material in foreign *Macworld*s. That's more people than read magazines such as *Science*, *Connoisseur*, and *Premiere*.

Back in the USSR

All of this makes me wonder what we might be able to accomplish in a nation like the USSR with 270 million people. At the time of Leonid Brezhnev's tenure there was a joke in Moscow that went like this: "Is it possible to wrap an elephant in a newspaper?" "Yes, if Comrade Brezhnev appeared at the Presidium yesterday"—an allusion to the fact that newspapers were required to print the full text of the stifling bureaucratese that constituted political speeches in the USSR.

For centuries Russia shared a great literary tradition with European cultures: Tolstoy, Dostoyevski, Gogol, Turgenev, Chekhov, Goncharov, Sholokov, Blok, Mandelstam, Babel, Pasternak, Solzhenitsyn. Writers who have vanished from (or never appeared in) government-sanctioned bookstores. Entire bodies of literature disappeared with the Communist consolidation of power in the 1920s. (After that the press and publishing became the organ of official opinion.)

Today, in the quiet bustle of a small office in Moscow, one can imagine the whistle of a LaserWriter fan and a slight grinding sound as the rollers push another page out. In excitement, people cluster around the machine to look at the Cyrillic text. For them, and for this nation, the Macintosh is truly a revolution. ■



JMP™ to All the Right Conclusions.

New JMP Statistical Visualization Software from SAS Institute Inc.

Make the quantum leap in data discovery with JMP... the easiest, fastest, most reliable way to visualize your data. Yours today on the Apple Macintosh®

JMP lets you combine powerful statistics and graphics in one highly interactive process. Just point and click. Tools for manipulating, analyzing, and storing data all fit together so that one simple command generates a whole series of results!

Data Analysis with a Visible Difference

JMP organizes classical statistics in six logical areas: *Distribution of Y's*, *Fit Y by X*, *Fit Y by X's*, *Specify Model*, *Spin*, and *Y's by Y's*. Each area comes complete with appropriate graphics. There's always a picture available for visually exploring your data, so you can make discoveries that just aren't possible through numeric reports alone.

Generate *leverage plots* for a point-by-point view of hypothesis tests...*means comparison circles* for viewing differences among group means...and multi-dimensional data views such as *spinning plots*, *biplots*,

and *scatterplot matrices*. JMP handles all combinations of measurement levels—interval, ordinal, and nominal—with appropriate statistical methods.

Call Today for a Free Technical Summary

JMP brings you superior statistics and graphics... backed by a full year of free technical support.

For more details about JMP, call our JMP Sales Department at (919) 677-8000. In Canada, call (416) 443-9811.



**From SAS Institute Inc.,
the number one name in data analysis software.**

SAS Institute Inc. □ JMP Sales Dept.
Box 8000 □ SAS Circle □ Cary, NC 27512-8000
Phone (919) 677-8000 □ Fax (919) 677-8123

To use JMP, you need an Apple Macintosh with 1+ meg, 2 meg recommended.

JMP is a trademark of SAS Institute Inc., Cary, NC, USA. Apple and Macintosh are registered trademarks of Apple Computer, Inc.

Copyright © 1989 by SAS Institute Inc. Printed in the USA.

See us at the San Francisco Macworld Expo at Booth # 5814

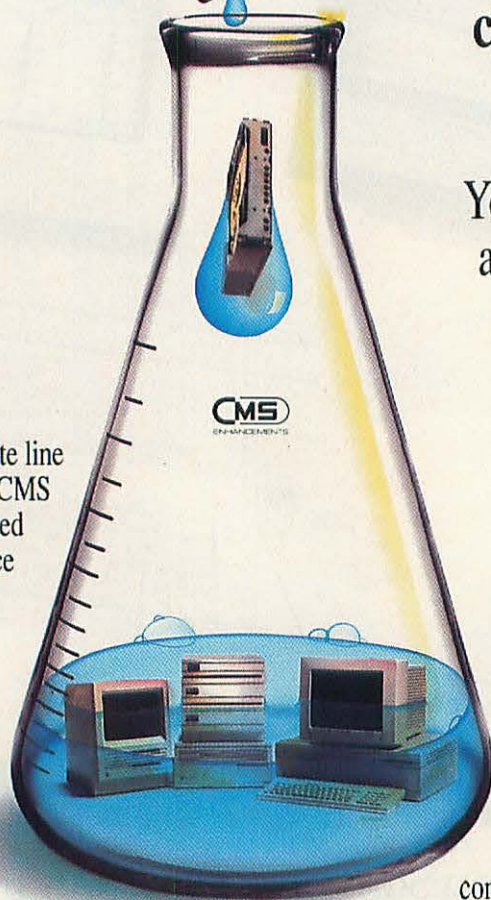
SOLUTIONS

CMS Enhancements provides you with the solutions to your most challenging storage problems.

You don't have to experiment with trial and error to solve your Apple® mass storage problems. That's because CMS Enhancements provides you with total solutions to meet today's storage needs.

Featuring a complete line of mass storage solutions, CMS hard disk drives are designed to optimize the performance of today's wide variety of Apple systems.

Whatever your capacity or performance needs, CMS has the disk drive that's right for you. And all of our models are engineered and manufactured to the highest standards of quality and reliability.



At CMS, we complement our state-of-the-art products with instant availability, competitive

pricing, and the finest in service and support. No wonder we're the industry's leading supplier of complete storage solutions— with over one million hard disk drives sold, worldwide.

Macintosh SE Solution: Platinum Series External Hard Drives; 90, 170, 300 and 600 MB. 16.5 - 18 ms.



Macintosh II Solution: Internal Hard Drives; 90, 170, 300 and 600 MB. 16.5 - 18 ms.

Macintosh IIx Solution: Platinum Series External Hard Drives; 90, 170, 300 and 600 MB. 16.5-18ms.



So contact your nearest CMS Enhancements dealer, today. And let CMS provide the perfect formula to solve your storage problems.

For the name and telephone number of your local CMS Enhancements dealer, call us at 714-259-9555.

CMS
ENHANCEMENTS

Circle 85 on reader service card

*Disclaimer: The CMS logo is a registered trademark of CMS Enhancements, Inc. All other products and brandnames are registered trademarks of their respective companies.

Copyright CMS Enhancements, Inc. 1989



LETTERS

A forum for Macworld readers

Can You Spare a Couple of Megs?

What a bunch of whiners! You will always need to upgrade computer hardware to take advantage of new and exciting technology [*Letters*, December 1989]. I'm surprised that these guys bought a Mac to begin with, when they were probably happy with their Speak & Spell (which, by the way, never needed an upgrade).

Hey, guys, wake up and smell the coffee. System 7 will run on everything from a Plus on up—as long as you have 2 megabytes (are you listening? 2MB) of RAM. With the cost of RAM steadily declining, what's the big deal? Is this too much to spend for IAC, outline fonts, new print architecture, database access, and so on? Five bucks says some of you are still watching black-and-white TVs and bitching about the C-note you dropped ten years ago for that HP calculator.

G. Overton
Des Moines, Iowa

Upgrade Optional, Not Required

From all the griping about System 7 in the December *Letters* column, I'd swear that RAM upgrades cost thousands of dollars and that Apple is going to recall all copies of System 6 as soon as System 7 ships.

System 7 is not going

to make your SE obsolete. Turn to page 96 of the December issue and you'll see an ad for RAM at \$119 a megabyte. My Calculator DA tells me that comes to \$238 plus shipping to make your Mac ready for System 7. No, you won't get virtual memory, but you don't have it now, either, so you won't be any worse off than you were before.

I find it hard to understand why users who won't balk at spending hundreds of dollars on the latest word processor, page-layout, or illustration program suddenly march themselves off to the poorhouse when confronted with the purchase of RAM.

Take heart, genuinely penniless Mac users who can't budget a RAM upgrade. Jean-Louis Gassée is not going to slide down your chimney one night and smilingly make off with your System Folder. You can keep running System 6 and your current ap-

plications till the cows come home—or till you win the lottery.

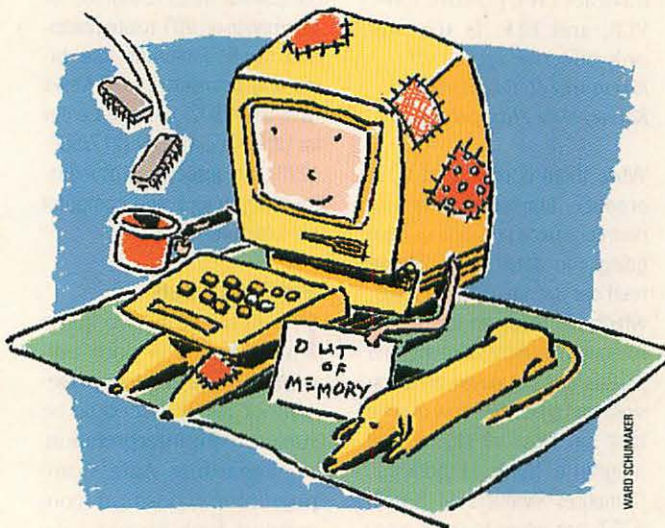
J. Peter Alfke
Tucson, Arizona

Package Pollution

You should add one more parameter to your evaluation of software, namely, the level of excessive hard-plastic (not shrink-wrap) packaging. Maybe you could even use a trash can symbol for amount of waste (for example, a one-can versus a four-can product).

I have come to be appalled by the number of hard-plastic presentation shells I toss when I get a new piece of software.

This stuff is very difficult to dispose of in the environment; it can actually trap and kill many forms of wildlife, especially in marine ecosystems. Coastal birds and some mammals ingest this stuff and either have their throats cut by it or starve to death. Cardboard (continues)



WARD SCHUMAKER

Corrections

RGB Technology charges \$720 per year for on-site service of its printers in the continental United States ("Hot Wax & Cold Ink," February 1990) and \$2000 for customers in Alaska and Hawaii.

Hey I Can Print, by R&B Software, 800/627-9778 (New Products, January 1990), is a series of printing tools for HyperCard and SuperCard.

The table "Number Processors" ("Math without Tears," January 1990) should have noted that MatLab 1.1 runs on the Mac, PC, VMS, and UNIX.

The following information should have appeared in the table "Forms Features" ("Forming Opinions," February 1990): Panorama 1.5 has been released; it can generate forms of up to 9 pages; it imports PICT and EPS graphics; and it offers data-entry constraint options.

Quality Discount Computers offers a 90-day (not a 30-day) warranty on its Mac/Apple II daisy-wheel printer (Conspicuous Consumer, February 1990).

The phone number for Mac Doctor Electronics, maker of Brainstorm memory expansion and SCSI interfaces and system upgrades ("Is Your Mac Obsolete?" February 1990), is 415/964-2131.



and paper can serve the same structural function for packaging; for example, HyperGlot uses cardboard and paper packaging for its language HyperCard stacks.

This is one industry that should be sensitive to that kind of thing.

*Elliot Einzig Porter
Berkeley, California*

Harmful Emissions

As an owner of a Mac SE, I have long wondered about the existence of harmful emissions beamed at me as I work. How bad are these thought to be by the medical community? And are there any reasonably priced products that effectively deal with these emissions?

Thus far, the seemingly most effective shield that I know about is the rather

expensive (\$179) Eyeguard-XP (Natural Energy Works, P.O. Box 1395-C, El Cerrito, CA 94530, 415/527-6267). It's a thick leaded shield that the company claims will filter out emissions from X rays, microwaves, ultraviolet rays, positive ions, VLF, and ELF. Is this my only effective recourse?

*Raymond H. Rosenstock
Keene, New Hampshire*

While there is proof that VDTs produce emissions that are harmful, space prohibits us from going into detail here. (Please read our upcoming June issue, which will focus on this topic.) Although monitor screens and shields can cut down on emissions and glare, we know of none that can block *all* electric and magnetic fields. Ergonomic Computer Products (415/673-5757) has information on many

of them. Safe Computing Company (617/444-7778, 800/222-3003) makes a shielded liquid crystal display monitor that it claims emits no electric or magnetic fields. The company also makes a hand-held meter to measure magnetic radiation from computers. Other resources for information on VDT-related radiation studies include the bimonthly newsletter *VDT News* (212/517-2802) and the Center for Office Technology (212/560-1298), an association of industry trade groups and computer manufacturers.—Ed.

Mac Font Formats

I want to clarify two items mentioned in your editorial [*Commentary*, December 1989] that could be subject to misinterpretation.

Regarding Agfa Compugraphic's position concerning font formats, we

intend to support the major font formats in the marketplace: Hewlett-Packard's PCL, Adobe's PostScript, and Apple's Royal. However, we have made no such commitment to manufacture a QuickDraw image-setter. This can be a confusing issue as it relates to the difference between font formats and page-description languages.

I also want to clarify my comments regarding HP and IBM. We are working with HP to address the significant office-publishing market with our Intellifont font-scaling technology and HP's PCL printer line. We have also worked closely with HP to bring to market a PCL-based imagesetter and font utility, Type Director. The point is, IBM—not (continues)



*"Double Helix...is for
Macintosh® users who want to solve
their information management
problems quickly, easily, and without
going mad in the process."*

Apple Business, November 1989

Lift yourself to new heights
with the code-free environment of
Double Helix. For more facts or
a Test Flight, call: 1-800-323-5423.

Double Helix®

The database that makes a picture
worth a thousand words.

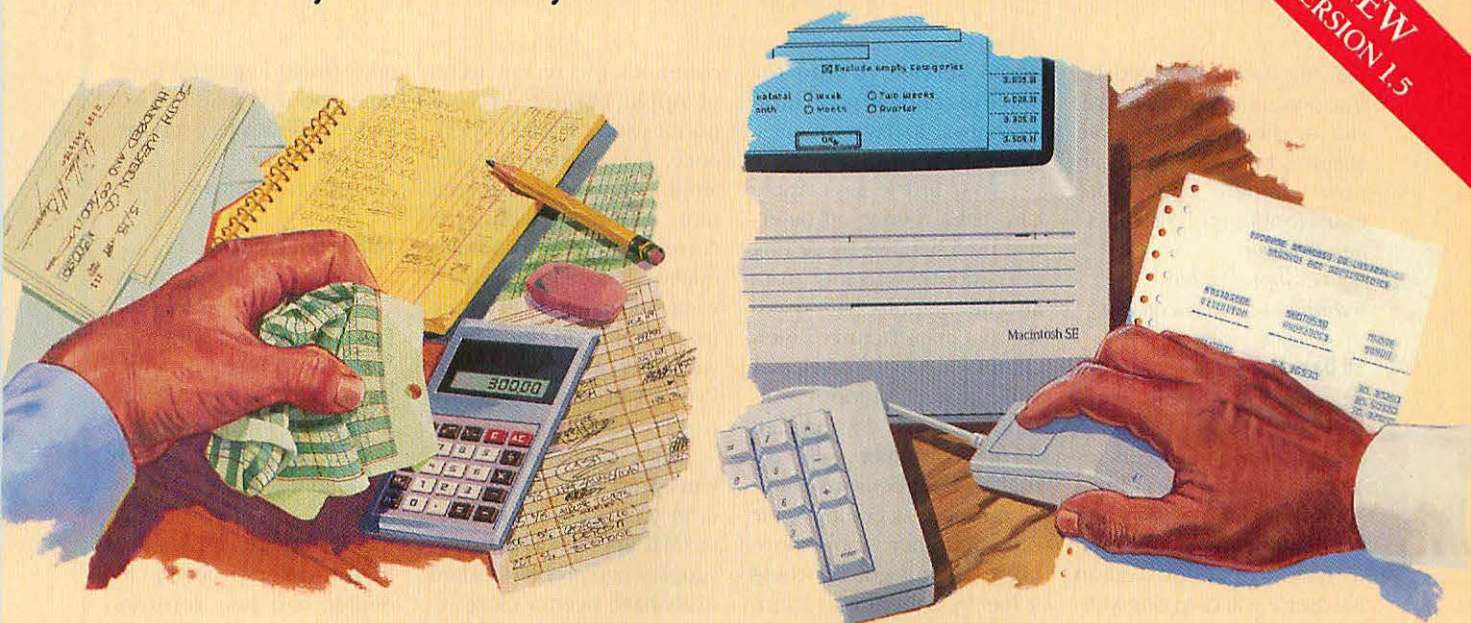
© 1990 Odesta Corporation. Macintosh and Double Helix are registered trademarks of Apple Computer, Inc., and Odesta Corp., respectively.

Circle 352 on reader service card.

AD11DH/040190

Say Goodbye to Financial Hassle

NEW
VERSION 1.5



So Long, Tedium ... Hello, Quicken

Why waste time doing your finances? Quicken slashes time and effort *every* month...perfectly organizes your finances...and provides instant insight into your money matters.

Breeze Through Financial Chores

Quicken takes the drudgery out of routine finances. It automates everything from bill paying to bookkeeping...reconciling to reporting. Quicken does in minutes what used to take hours.

Quicken actually learns your regular bills. *In seconds*, it hands you printed checks already addressed for mailing.

Quicken even saves you time with handwritten checks. With a few key-strokes, just enter the transactions, and Quicken eliminates the math and the mistakes.

A Bigger Picture with Smaller Effort

Quicken automatically organizes your finances. Imagine always knowing how much money you have...and exactly where it's going. At the click of a button, Quicken generates insightful reports such as Income and Expense, Cash Flow, Budget vs. Actual, Job Costing, and more.

Relax at Tax Time

Stop dreading April 15. With Quicken's Tax Summary reports, you'll instantly have itemized lists supporting each tax deduction. Plus, Quicken links directly to top selling tax software such as MacInTax®.

NEW VERSION 1.5

- More flexible reporting;
- New multi-column reports for trend tracking
- A/R aging and customer history reports
- A/P reports by supplier
- "Modeless" reports recalculate automatically on screen
- Improved payroll handling
- More ways to split transactions
- New wallet-size and laser voucher checks
- New Canadian dates and tax categories

No Wonder It's #1 in the World

Quicken is the best selling finance software in the world. Ken Landis of



MacUser gives Quicken the highest rating of five mice and says, "Quicken is a great program...the industry standard."



No Accounting Mumbo Jumbo

If you don't know a "debit" from a "credit" and don't want to learn, Quicken is for you. It's so easy, you're up and running in minutes. Because the whole program looks and works just like the paper checkbook and register you've always used.

Powerful Business Features

Over half of Quicken's customers use it for small business bookkeeping. Quicken produces financial statements such as P&Ls, Tax Summary, and other useful reports. It forecasts cash flow, tracks A/R, A/P, payroll, jobs, and more.

Try Quicken FREE for 30 Days!

Order from the coupon below, and if you're not completely satisfied for *any* reason, simply return it for a full, no-questions-asked refund. So, why wait? Say good riddance to financial hassle, and order Quicken today.

\$59⁹⁵



Yes, I want to say goodbye to financial hassle and try Quicken. If I'm not completely satisfied, I may return it within 30 days for a full refund. Quicken Version 1.5 for Macintosh® at \$59.95, includes *free shipping by air*. CA residents, please add sales tax. For coupon orders, allow 10 days for delivery in U.S., and longer to Canada.

Name

Address

City State Zip

Daytime Phone ()

Preferred payment method (check one)

☐ Check enclosed (no purchase orders or COD, please)

☐ Visa ☐ MasterCard ☐ American Express

Card No. Exp. Date

Signature

Mail to:

Intuit

P.O. Box 3014
Menlo Park, CA 94026

Or, call:
1-800-624-8742
in U.S. and Canada.

G-MW04

All These Videos Were Created By A Mouse

COLORSPACE IIi

If you can point and click, you can produce professional quality color videos with ColorSpace IIi. The video card that lets you overlay anything created on a Mac II onto live or recorded video.

ColorSpace IIi's



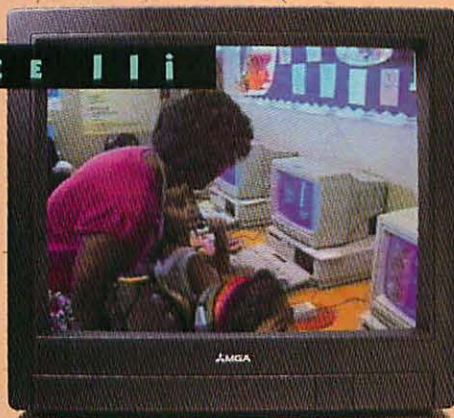
advanced
genlocking
technology

assures crisp, high-quality images by synchronizing Mac graphics, titles, and animations to any standard TV video signal. You can even digitize still images from a video camera.

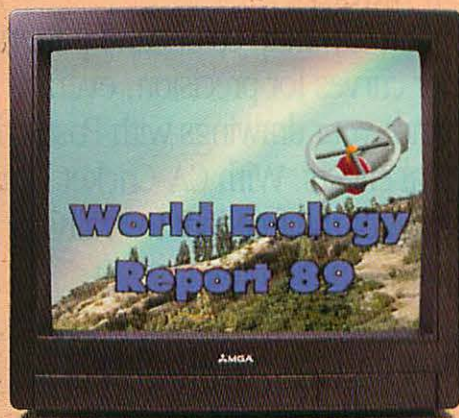
And while ColorSpace IIi is easy to use, it lets you get as sophisticated as you want. Because it works with all the most powerful Mac software—HyperCard,[™] SuperCard,[™] and Director.[™]

All of which makes ColorSpace IIi the technology of choice for today's desktop video applications: animations; film and commercial storyboards; sales/promotional/instructional videos.

For details, your nearest dealer, and to order our \$9.95 demo tape, call 800-522-7979. And let your mouse make you a star.



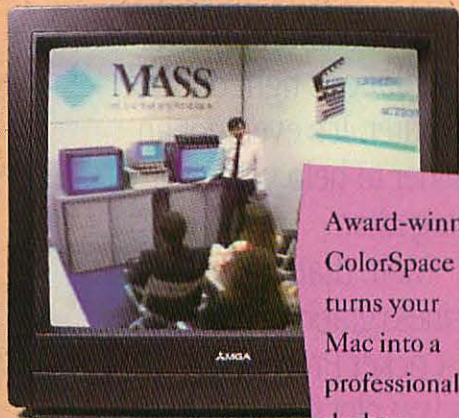
EDUCATION



PRESENTATIONS



PROMOTIONS



TRAINING

Award-winning
ColorSpace IIi
turns your
Mac into a
professional
desktop
video
production
studio.



550 Del Rey Avenue, Sunnyvale, California 94086. In Canada call 604-276-2326. For international distribution call 408-522-1200. All trademarks are the property of their respective owners.

CA-Cricket Appeals To Any

MIND-BLOWING GRAPHICS FOR YOUR CREATIVE HALF.

Realism, cubism, company logos—with CA-Cricket Draw™ you've got the power to draw them all. That's because CA-Cricket Draw's highly advanced graphics tools let you do things heretofore found only on the most expensive drawing programs. And let you do them with ease.

You can map colors and patterns, use bezier curves for precision, even enhance your drawings with PostScript® special effects. With CA-Cricket Draw you've got the freedom to really let your imagination roam.

CA-Cricket Presents™ is an all-star desktop presentation program that lets you prepare slides, overhead transparencies, handouts and electronic presentations right on your computer. It's even got an outliner to help you get it all together.

More than just a business graphics program, CA-Cricket Presents lets you plot graphs, draw logos, even generate your entire presentation from the outliner with a single click. All in bright, vivid color. With CA-Cricket Presents, you get the best of both worlds in one easy-to-use program.

PostScript is a registered trademark of Adobe Systems, Inc.

one With Half A Brain.

VIVID VISUALS FOR YOUR ANALYTIC HALF.

No need to let the other half have all the fun. With CA-Cricket Graph,[™] your analytic side can be every bit as creative. You'll find 12 different graphs to choose from—everything from log charts to polar graphs—with applications for both science and engineering. You can customize fonts, shades and color patterns

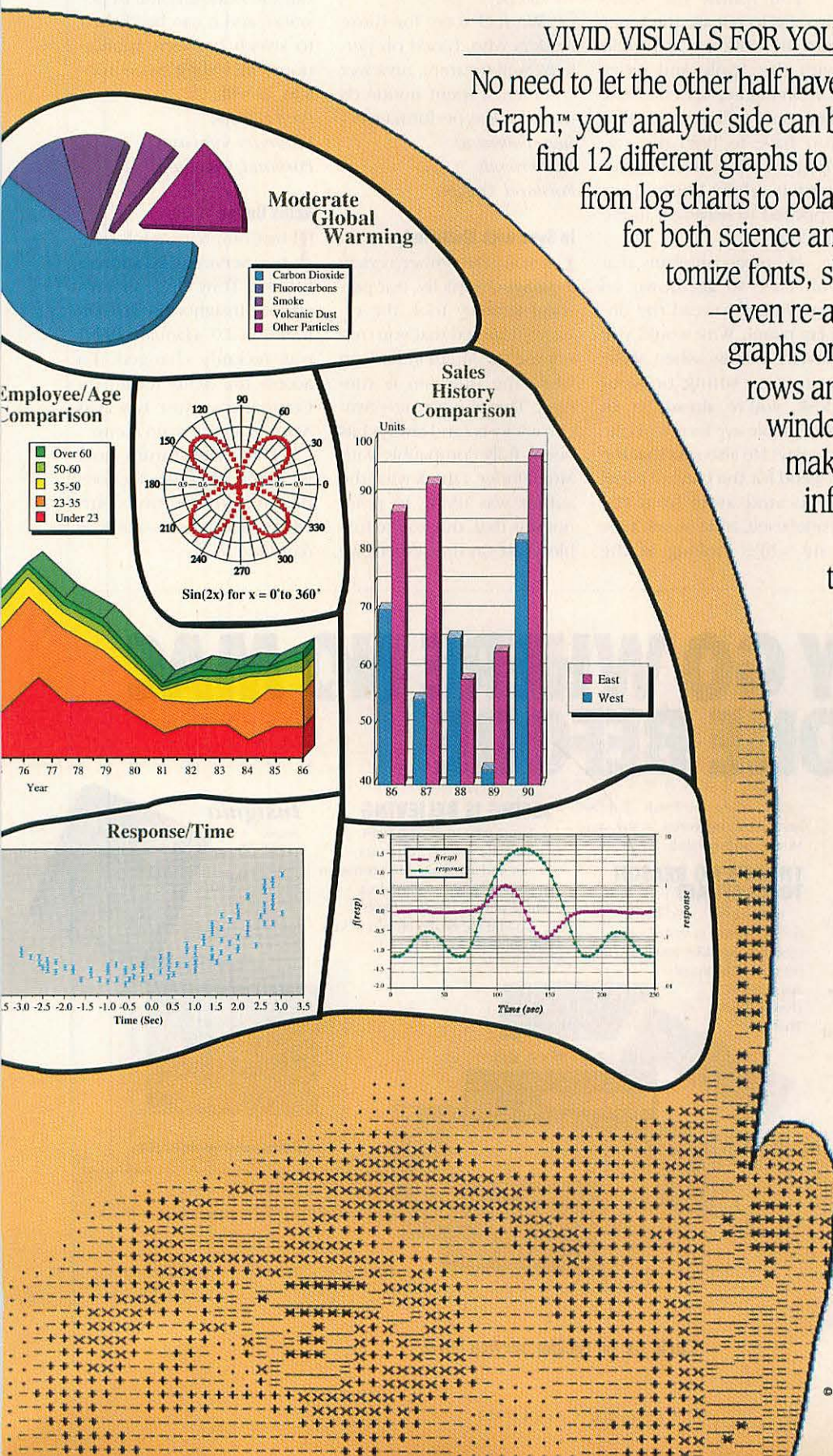
—even re-arrange and re-size your graphs on the page. With up to 2,700 rows and 40 columns in each data window, CA-Cricket Graph can make even the most complex information look intelligible.

In addition to being easy to use, you'll find that all three CA-Cricket programs can be rather sophisticated. So you won't outgrow them once you learn how to use them.

And all three share one very special feature—their innovative user interface.

No other software gives you so much bang for your buck. Which is why CA-Cricket isn't just the emotional favorite. It's the logical one as well.

For the authorized CA-Cricket dealer nearest you, call 1-800-531-5236 (in Canada, 1-800-663-6904).



COMPUTER ASSOCIATES
Software superior by design.

© 1990 Computer Associates International, Inc., 711 Stewart Avenue, Garden City, NY 11530-4787

Circle 510 on reader service card

plain, but received, predictably, little sympathy, no support, and no admission of guilt.

I asked my dealer to order me three additional 1MB SIMM chips from Apple. Of course, they're back-ordered. I've been waiting six weeks and the best delivery estimate Apple can give my dealer is "maybe this month."
Michael Darling
Ossining, New York

Erasing Some Black Marks

After reading your December review of the Ricoh PC Laser 6000-PS printer (our best-selling laser), we were puzzled by your statement that replacing the toner can be a messy job. Not one customer has ever complained about having to clean up a mess. We've used several alongside our Apple Laser-

Writers on a network and found them no messier than the Apples.

You follow the same process to release the toner into the work tray as you do with the Apple and other Canon engine-based lasers. The only difference is that you have to hold the cartridge in place, and then discard it when finished, as opposed to leaving it in the machine.

He next complains that you have to get down on your knees to read the display panel. Why would you have to do this, when, if the printer is sitting on your desk, you're already at an acceptable eye level with the display? He also says that the legend for the control panel is located away from the panel itself, and you can't see one while looking at the

other. Not true. The control panel legend is visible right on the control panel as it should be.

We feel sorry for those readers who, based on perhaps well-meaning reviewer comments, spent hundreds more for less performance.
Steve Folkestad
Mac Friends
Portland, Oregon

In Sync with MultiFinder

In your December review of Synchronicity, our personal strategy tool, the reviewer claimed that you cannot use the MultiFinder icon while the program is running. This is not true—Synchronicity is (and always has been) fully compatible with MultiFinder. I think what the author was trying to point out was that, due to the full-bleed art on the screen, we

opted to keep the Multi-Finder icon invisible while the program is being used. But the button is still in position, and it can be clicked to switch between applications, including Synchronicity, at will.

Paul O'Brien
Visionary Software
Portland, Oregon

Acius Online

The CompuServe Information Service (CIS) address listed in Tony Oppenheim's article "Insights on 4th Dimension 2.0" (January 1990) was recently changed. To access the Acius forum on CompuServe, just type Go Acius from the main menu.

The Acius forum now provides multiple sections dealing with various 4th Dimension topics—such as
(continues)

BOLDLY GO WHERE NO MAC HAS GONE BEFORE

Macintosh® users can finally choose from the thousands of software programs only available for the PC.

With SoftPC®

The only software package that brings true MS-DOS® compatibility to a Mac II, IIX, or 68020-accelerated SE.

SoftPC enables you to run all the PC best-sellers—Lotus® 1-2-3®, WordPerfect® etc.—on the Mac. And those PC programs developed in-house for special purposes.

You can even use PC and Mac programs at the same time, thanks to SoftPC and Apple's MultiFinder™. Copy and paste between PC to Macintosh applications.

And when you finish, all information can be stored on the same Macintosh hard disk.

THERE'S NO REASON TO BE AFRAID

No boards... No hassles... SoftPC is easy to install and upgrade. Just like you'd expect from any Macintosh application. Double-click. That's it.

SEEING IS BELIEVING

Don't take our word for it. Visit the nearest computer dealer and ask for a demonstration of SoftPC. SoftPC will open a whole new universe for you.

To find the dealer closest to you, call 800-848-7677.

Insignia

Insignia Solutions Inc.,
254 Genovito Way
Sunnyvale,
California 94086
Tel. (408) 522-7600
FAX: (408) 733-9541

™ trademarks and ® registered trademarks of their respective companies.



Circle 69 on reader service card.

CheckFree: The Fastest Way To Pay Bills And Handle Finances.

CheckFree®

**Electronically Pays All Your Bills
And Automates Your Recordkeeping.
No Checks, No Stamps, No Paperwork.**

Specially Designed for The Macintosh.®

For the first time, Macintosh users can experience the speed, convenience, and simplicity of paying bills the CheckFree way. Now you'll discover that CheckFree is the superior bill-paying solution.

It Couldn't Be Easier.

All you do is enter payment information, and CheckFree software automatically records, categorizes, and sends the information to the CheckFree Processing Center via modem. Payments are then processed through the Federal Reserve System—the same system that banks use to clear your checks today. Fixed, recurring payments (such as mortgages) can be made automatically; once they're set up, you never have to bother with them again.

Pay Anyone Through Any Bank.

You can pay anyone with CheckFree because the CheckFree Processing Center utilizes electronic transfers as well as laser printed checks to make payments. If a company or individual you are paying is not set up for electronic payment, the CheckFree Processing Center will print and mail a laser printed check for you. Because of its universal payment processing technology, CheckFree can process payments to anyone in the U.S. through the checking account you already have at any bank, credit union, or savings and loan.

No Loss Of Float.

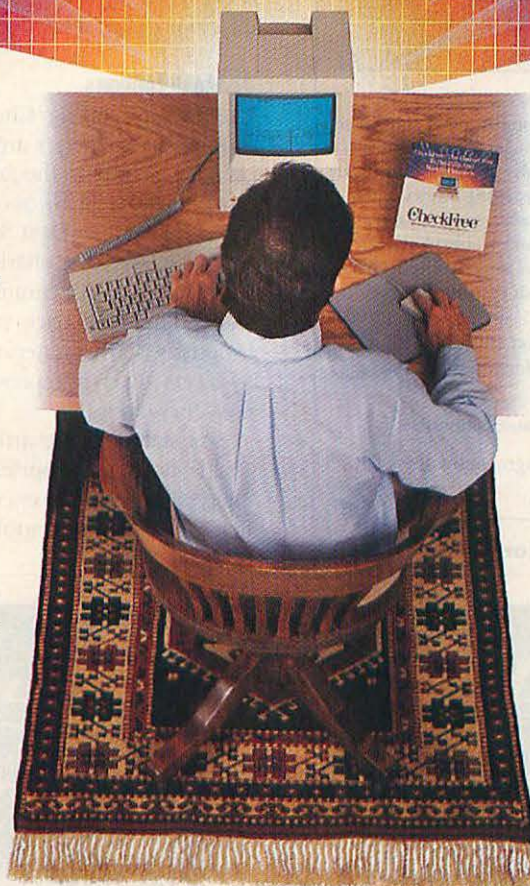
You tell the CheckFree software when you want your bills paid and the CheckFree system pays them on the dates you specify. All we need is a few days advance notice to make sure your payments get processed on time.

Saves Time, Paperwork, And Money.

Your bill paying and other routine financial activities can be reduced to just a few minutes. Paperwork becomes virtually non-existent. Plus, the CheckFree service is only \$9.00* per month—not much when you consider the savings in postage, bank charges, and late fees.

Availability: CheckFree is carried by leading retailers including Egghead Discount Software®, Electronics Boutique®, Babbage's®, Walden Software and Bookstores®, and Software Etc.® Also available through the CompuServe Electronic Mall (Go CF). **Hardware Requirements:** Macintosh® 512KE or higher, 800K drive, and a Hayes® compatible modem. **Guarantee:** If you are not completely satisfied with CheckFree software, return with proof of purchase within 30 days for a full refund (phone or mail orders only). **Limitations:** Over 20 monthly transactions involve a nominal surcharge (\$3 per ten payments or portion thereof). CheckFree is a registered trademark of CheckFree Corporation. All other trademarks are the property of their respective corporations.

Reprinted from PC Magazine, November 14, 1989. Copyright © 1989, Ziff Communications Company.
Copyright © 1989 by Scholastic Inc. All rights reserved. Reprinted from the May issue of Home Office Computing magazine.



Organizes Your Finances.

CheckFree gives you a completely automated checking account register that's updated automatically with each transaction. You can also record deposits or other non-CheckFree transactions. Checkbook reconciliation is virtually automatic. There's even an easy-to-use package of income, expense, and budget reports that keeps you constantly aware of what's coming in and what's going out. Plus, you can export CheckFree data to Excel® and MacIntTax®.

Completely Secure.

CheckFree is more secure than conventional check writing. Payments are processed through the Federal Reserve System, so CheckFree never requires actual access to your account. Only you have access to your funds and only you authorize payments.

Backed By The Nation's Leader In Electronic Payment Services.

CheckFree has been the leader in electronic payment processing since 1981, with current payment volume exceeding \$1,000,000,000 annually.

Used By Thousands All Over The U.S.

See what experts have to say:

"The CheckFree electronic bill-paying service belongs to that rare class of product that is forward-looking, universally useful, and available today."



**PC Magazine, Best of 1989 Awards
January 16, 1990 issue**

"CheckFree makes bill paying a quick, painless task rather than a monthly ritual to be dreaded... CheckFree Corporation has been handling commercial electronic payments for companies such as CompuServe® for years, and their experience and professionalism showed in all aspects of my dealings with them."

PC Magazine

"...CheckFree did not fail me. When my banking statement arrived the first thing to catch my eye was a CheckFree check...this was reassurance that someone else could be trusted to pay my bills..."

Robert Cullen, Home Office Computing

To get CheckFree working for you, call **1 800 882 5280** (Monday through Friday from 9AM to 7PM EST), send in the coupon below, or see your local dealer.

Yes, I want a fast, easy way to pay bills and handle my finances! Please send me:

CheckFree®

☐ CheckFree software for the Macintosh just \$29.95. (Money back guarantee; return within 30 days if not completely satisfied for full refund.)

☐ Also, please send me a Hayes Personal Modem 1200* for an additional \$99.00.

(Ohio residents add 5 1/2% sales tax.)
A \$4.00 shipping charge will be added to all orders.

Name _____

Address _____

City, State, Zip _____ (No P.O. boxes please)

Daytime Phone (_____) _____

Credit Card Type or Personal Check (circle one)
MC VISA AMEX CHECK

Credit Card Number _____

Expiration Date _____

Signature _____

Mail to: CheckFree Software
P.O. Box 897
Columbus, Ohio 43216

Please allow 14 days for delivery on mail orders. **MAC 4**



PREVENT MACINTOSH THEFT!



MacKablit Security System

Heavy duty 10' steel cable secures and locks computer, printer, other equipment, up to 4 components. The unique **MacKablit** system includes 2 brackets that snap into existing slots on the Macintosh or its peripherals. Additional hardware included for other peripherals that can be secured using existing screws in the equipment. **Internal component security:** **Kablit™** fasteners secure rear panel of CPU preventing unauthorized removal of internal boards and hard drives. When the cable is passed through the fasteners the screws are concealed. When the cable is passed through all the fasteners the Macintosh system can be secured to the desk.

List price \$39.95 plus shipping. Please specify Mac, Mac Plus, Mac SE, or Mac II. Quantity pricing also available. Money back if returned in 30 days. Purchase orders accepted. Send for catalog.

Kablit security systems also available for most computers.

Secure-It, Inc. 18 Maple Court • East Longmeadow, MA 01028
1-800-451-7592 Dealer inquiries invited.



Circle 239 on reader service card

technical and customer support—as well as an exclusive developer area. The upload areas feature many examples and external procedures for enhancing 4th Dimension databases.

*Ron Dell'Aquila
Acius
Cupertino, California*

DiskLock Encryptions

I enjoyed reading Cheryl England Spencer's article on data security in the January 1990 issue of *Macworld* ["Special Report: Data Safety"]. However, the chart on page 145 was inaccurate. It showed that DiskLock, published by Fifth Generation Systems, does not provide data encryption.

As stated in the article, DiskLock uses a proprietary encryption system to encrypt fields, folders, and applica-

tions. Additionally, it encrypts subfolders within a folder, overwrites the original file (so that file-recovery programs cannot get data you thought was securely locked), and optionally re-encrypts all decrypted files at shutdown time.

*David Shayer
Fifth Generation Systems
San Carlos, California*

.....
Letters should be mailed to *Letters, Macworld*, 501 Second St., San Francisco, CA 94107, or sent electronically via CompuServe (70370,702) or MCI Mail (294-8078). Include a return address. We regret that, due to the high volume of mail received, we're unable to respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of *Macworld*. **M**

*"...a fine unit at an attractive price."
—Macworld, December 1989*

A special offer of only \$795* on the most affordable tape system you can own. And we can back it up.

Sooner or later your Macintosh will need the security of data back-up. So the question is, which method? Removable disk media is too expensive. Floppies are too slow. And some systems/media are too volatile.

That's why the Braemar SX40 Data Cartridge Sub-system makes sense. There's no faster, safer method of back-up than cartridge tape. And now, the Braemar SX40 makes it affordable.

Braemar is a leading manufacturer of tape-based systems for the OEM marketplace. In fact, we make many of the drives sold by our competition.

So obviously we can back our claim. And build it for less.

**TO ORDER THE SYSTEM THAT
BACKS YOU UP, CALL.**

1-800-328-2719

11400 Rupp Drive, Burnsville, MN 55337
(612) 890-5135 Fax (612) 890-0791

*This special price expires June 30, 1990 and is not valid with any other offer. \$995 suggested retail price. 60Mb per Cartridge Capacity. The SX40 uses the DEI or 3M Series 2000 Data Cartridge.

"A WORLD LEADER
IN DATA
STORAGE TECHNOLOGY"

Braemar



**New
60 Mb
Version**

Who says SuperPaint 2.0 is so great?

"...for plain old drawing and painting, you can't beat SuperPaint."

Erfert Fenton, **Macworld**, August 1989.

"SuperPaint 2.0 is, without a doubt, the best upgrade I've ever paid for."

Dan Gookin, **ComputerEdge Magazine**, March 10, 1989.

"SuperPaint remains the best black and white graphics program around."

Laurie Wigham, **Publish!**, August 1989.

"I've decided it's a better overall product than Canvas... SuperPaint has more to offer."

Robert Art Morgan, **ComputerEdge Magazine**, June 30, 1989.

"...one of the most intuitive implementations of Beziers I have seen."

Carlos Martinez, **MacUser**, July 1989.

"SuperPaint offers quantity, quality, and depth in each of its options."

DataPro's Microcomputer Lab staff, **DataPro Research Letter**, April 1989.

"It's a godsend for simple art."

Tom Thompson, **BYTE**, June 1989.

They Do.



SILICON BEACH
SOFTWARE

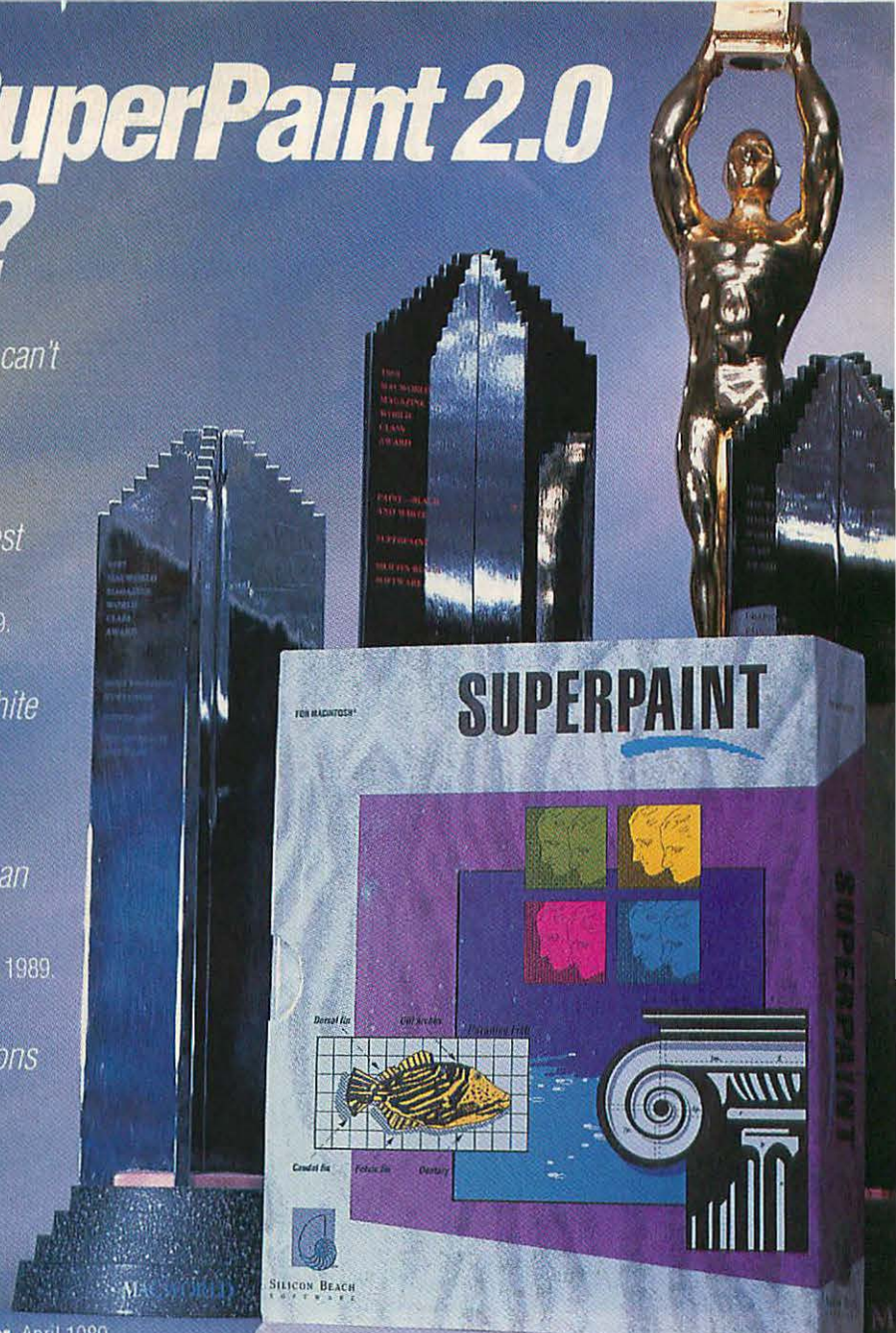
SUPERPAINT

It just works better.

Suggested Retail Price \$199. Upgrade \$50 plus tax and shipping. To upgrade, call or write Silicon Beach.

System requirements: Macintosh Plus, SE, SE/30, II, IIx or IIcx, System 6.0 or later. The Silicon Beach Software logo is a trademark of Silicon Beach Software, Inc.
Silicon Beach Software, Inc. • 9770 Carroll Center Rd., Suite J, San Diego, CA 92126 • (619) 695-6956

Circle 266 on reader service card



AWARDS

1986
InfoWorld Product of the Year - Presentation Graphics
Macworld World Class Award - Most Promising Newcomer

1987
MacUser Eddy Award - Best New Graphics Program
Macworld World Class Award - Best Graphics Program

1988
Macworld World Class Award - Best B&W Paint Program

1989
Publish! Readers' Choice Award - Best Macintosh Paint Software

If You Use These...



Let's face it. Although Caere* nearly eliminated EKS (Excessive Key Strokes®) with the introduction of *OmniPage*™, there are still businesses out there who continue to use slightly *outmoded tools*, seriously limiting the power of their MS-DOS® and Macintosh® computers. Sound familiar?

Now there's a choice. You can enter data using these artifacts of the past, or choose *OmniPage*—which allows you to enter hundreds of pages of data quickly and easily—up to 1500 words per minute. And all for significantly less money than you ever thought possible. You can *choose OmniPage*, or learn to type 25 words per second.

And if that doesn't convince you, consider this: *OmniPage* has just

gotten even more powerful, with the addition of a few new family members.

Caere has never been a company to mince words so we developed *OmniSpell*™, a spellchecker that contains 100,000 words that works with *OmniPage* to correct all of the spelling errors in your scanned documents, even those in the original work—going beyond 100% page recognition to deliver the most accurate scanned text. Working with *OmniPage's* Transitional Editor™, *OmniSpell* is the only spellchecker designed specifically to work with OCR™ software.

With *OmniDraft*™, draft mode documents don't have to come out looking like electronic alphabet soup. At last, page recognition software that

can read output from dot matrix printers—in an instant.

Not to be outdone by other prominent family members, *OmniProof*™ makes the differences *perfectly clear*, by providing side-by-side comparisons of your most critical documents. *OmniProof* works exceptionally well for anyone developing lengthy desktop published documents or manuals. Even opposing attorneys will have little opposition to the way that *OmniProof* allows them to review legal contracts and documents. *OmniProof*, the one tool to insure the best final outcome, no matter what side of the bar you happen to be on!

And with our most recent family addition, *OmniTrace*™, you can now

Consider These



recognize pictures and images the way *OmniPage* lets you scan words—flawlessly. Especially useful for graphic designers, architects and those in business who are concerned with *image*, you can bring any picture into focus. Even complex business forms. Scan black and white images and instantly convert them to PostScript® format for high-res output. Use *OmniTrace*'s sophisticated editing tools to refine any shape, curve or line. It's the one software tool from Caere that allows you to put your best image forward.

Caere, the company that defined *page recognition*—just expanded that definition.

Call:
1-800-535-SCAN

Or Write:
Caere Corporation
100 Cooper Court
Los Gatos, CA 95030

*Excessive Key Strokes (EKS) has been known to cause knee quivers and thumb spasms in data entry personnel, engineers and graphic designers who work with computers.

**OCR is an abbreviation used by industry experts for *optical character recognition*, an important component of *page recognition*.

omniPAGE™



CAERE®

The Caere name and logo are registered trademarks of Caere Corporation. OmniPage, OmniTrace, OmniSpell, OmniDraft, OmniProof and Transitional Editor are trademarks of Caere Corporation. Apple and Macintosh are registered trademarks of Apple Computer, Inc. MS-DOS is a registered trademark of Microsoft Corporation. PostScript is a registered trademark of Adobe Systems Incorporated. © Copyright 1989, Caere Corporation. Printed in the USA. All rights reserved.



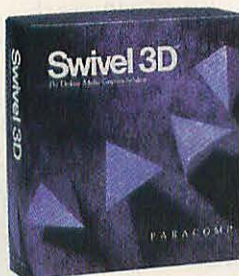
Illustration created in Swivel 3D by Joe Sparks.

EXPRESS YOURSELF WITH BETTER GRAPHICS

Swivel 3D™ is the best-selling, three-dimensional Macintosh program for anyone who needs high-quality graphics for product design, scientific visualization, animation, and graphics for desktop publishing and multimedia presentations.

Easy to learn and use, Swivel 3D comes with an extensive library of 3D art including alphabets, human figures, robots and additional shapes and figures.

By instantly changing the lighting, casting a shadow, or placing 2D art over a 3D surface, Swivel



3D gives you the freedom to explore all kinds of dramatic possibilities. Quickly and easily.

What's more Swivel 3D works with your other graphic programs because it supports all the popular formats: Encapsulated PostScript® for Adobe Illustrator; PICT2 for Studio8; PixelPaint and PageMaker; PICT for MacDraw II; and the animation format — PICS — for MacroMind Director.

Express yourself. Call (415) 543-3848 today. Demo disks are available for \$10.

P A R A C O M P

Swivel 3D is a trademark of Young Harvill/VPL Research, Inc. Other brands and product names are trademarks or registered trademarks of their respective holders. © 1989 Paracomp, Inc.

Circle 229 on reader service card

ART BEAT

by Deborah Branscum

This column examines the tools and the talent behind Macworld's graphics and discusses the techniques that make them possible

Artists: *Macworld* designer Arne Hurty created the dramatic cover image, referring to gray-scale software, based on a concept by art director Joanne Hoffman.

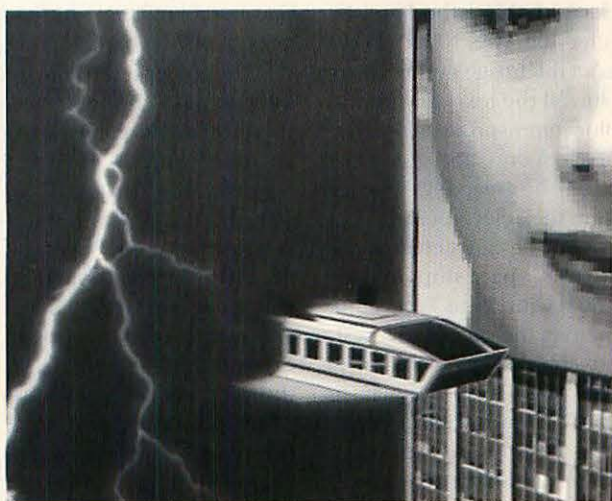
Tools: The hardware included a Macintosh IIfx, a Radius Color Display System with a Radius QuickColor Graphics Accelerator, 8MB of RAM, a 100MB external SuperMac DataFrame hard disk, a Siemens ST800 gray-scale scanner, and a Barneyscan slide scanner. The software used was Adobe Photoshop, Aldus FreeHand, and Capture from Mainstay.

How It Was Done: Hurty used four transparencies from a photo service, an illustration

in FreeHand, and typeset Japanese text to create a cover image that conjures up the illusion of a *Blade Runner*-like future.

To get started, Hurty used the Barneyscan scanner to scan in two 35mm slides of buildings as TIFF files that were placed into a Photoshop file. Too small as they were, Hurty duplicated both buildings to double their width. Next he selected the background of the Photoshop file, then copied and pasted the lightning (which had been scanned in earlier) inside the background.

Art director Hoffman wanted to establish a low-resolution look for the face used on the cover. Hurty opened the scanned image in Photoshop and *sampled down* the image to reduce its total number of pixels. Then he resampled it to a larger size using the *near-* (continues)



EFFECTS
Specialist
**Exactly What
You've Always
Expected...**
from the Leader in
**Font Enhancement
Software!**

Featuring:

- 110 effects, including circles, arcs and motion effects
- Absolutely no programming
- On-screen representation (WYSIWYG)
- Output on dot matrix printers
- Color support
- Cut, paste and export to most other programs
- Use with any PostScript™ or bit-mapped font
- Up to 4999 point size
- Tiling capabilities
- Complete background generator/editor
- Kerning
- Horizontal scaling (stretch/condense)
- Rulers (picas, inches, decimals, centimeters and pixels)
- Skew/rotate
- Character control (opaque to transparent)
- Save multiple EPSF files

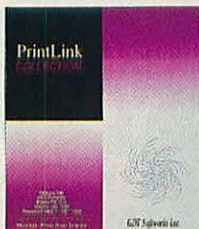
...all this and much, much more in one complete package for only \$249.95!

**Output on any printer
...\$100 to \$100,000
...Dot Matrix to High
Resolution Laser Printers.**

See your local dealer or contact:

POSTCRAFT
INTERNATIONAL INC.
27811 Avenue Hopkins, Suite 6, Valencia, CA 91355
(805) 257-1797
Dealer inquiries invited

Printer Connectivity Is What We Do Best



JetLink Express:™ The ultimate Macintosh® software printer driver for the HP LaserJet™ series, HP DeskJet™ series and HP compatible laser printers. JetLink Express includes 13 outline fonts. Features supported include: reduction, enlargement, gray scales, and more.

PrintLink Collection:™ A series of Macintosh software printer drivers which support the Epson LQ & FX series, Okidata 300 series, Panasonic 1000, 1100 and 1500 series, NEC Pinwriter series and Diconix 150 & 300. Supports Adobe Type Manager.™



GDT Software Inc.

P.O. Box 1865, Point Roberts, WA 98281
Inquiries: (604) 291-9121 Orders: 800-663-6222

See you at MacWorld
Brooks Hall
Booth #5210

JetLink Express, PrintLink Collection and the GDT Starburst logo are trademarks of GDT Software Inc. All names and logos are trademarks or registered trademarks of their respective holders.

Circle 439 on reader service card.

est neighbor interpolation command under the Edit and Preferences menus in Photoshop. That interpolation creates groups of four or more pixels that are the same color, resulting in a low-resolution look from what is actually a high-resolution image.

Because Photoshop skews an image but doesn't offer true perspective, Hurty was forced to compress the face vertically in tiny increments. "The hardest part of creating the cover was producing the effect of perspective," says Hurty. He compressed the face from right to left, from least distortion to most distortion, using the Stretch command under the Effects and Image menus. Then he pasted the face onto the building on the right. Hurty followed the same process for the Japanese text, which was set at a service bureau and then scanned in with the Siemens device. (The kanji reads *Macworld* phonetically.)

For both the face and text Hurty selected the Fringe command from the Select menu to create a 1-pixel-wide black outline around the elements. He also added drop shadows. A graduated fill was also used with the text, and texture was placed behind the kanji by selecting the Noise Filter from the Image menu. Hurty blurred the texture with the Blur command, also from the Image menu, and got softer edges by selecting Feather from the Select menu.

The designer created the cover's spaceship in two hours with Aldus FreeHand, then set the program to best-possible screen resolution by selecting Better Display in the Document Setup dialog box. He captured the illustration and saved it as a PICT file using a utility called Cap-

ture. Then the bitmapped image was placed in the Photoshop file and resized. Hurty selected the spaceship and added a Motion Blur filter for a motion effect.

Several other details demanded attention. In doubling the high rise on the right, Hurty also duplicated a shadow; he eliminated it by copying and pasting a pristine panel from the building. And the background lightning was extended so it would bleed off the top of the cover. Hurty used Photoshop's brush tool in Lighten Only mode.

Blotches in the background were a special challenge. Initially Hurty tried to smooth out the blotches by using the eyedropper tool. That didn't work, so Hurty selected the background using the magic wand and lasso tools from the tools palette. Then he created a radial fill using the blend tool, with the foreground color set at 65 percent gray and the background set at 100 percent black. He worked from the center to create a starburst-like effect. Then Hurty applied the Noise Filter to the entire background. "The Noise Filter breaks up the gradation evenly and helps avoid banding," said the designer. "Then I applied the Gaussian Blur filter to further smooth out the background."

The completed image took about 33 hours to create (including stuffing the file and sending it out for comps). More than 8MB in size, the image was printed at a resolution of 142 pixels per inch. The cover was digitally separated using Photoshop and output on an Afga Compugraphic 9600S. Although simple black-and-white printing could have been used, four-color separations were chosen because they create richer blacks. **M**

DIAMOND PAC



SINGLE IN-LINE MEMORY MODULES for Mac Plus, SE, SE/30, II, IIfx, IIsx, IICx

- 256K, 1M, 4M
- Low Profile SMD CMOS
- Easy to Install
- Lifetime Guarantee
- Static Protected
- Same Day Delivery

Expand your Mac memory by 1 to 32 megabytes with Diamond-Pac top quality SIM modules from AMDI.

AMERICAN MICRO DISTRIBUTORS INC.



714/840-5560 • 800-243-6654

FAX: 714-846-0570

16897-D Algonquin, Huntington Beach, CA 92649

MC VISA AmEx Discovery

All Mac models listed above are trademarks of Apple Computer Corp.

INVESTMENT OPPORTUNITY - AMDI is a wholly owned subsidiary of Logitron, Inc. with stock currently offered "over the counter". For more information about this excellent investment opportunity contact your broker or call AMDI directly.

Circle 403 on reader service card.

Beyond Reality.

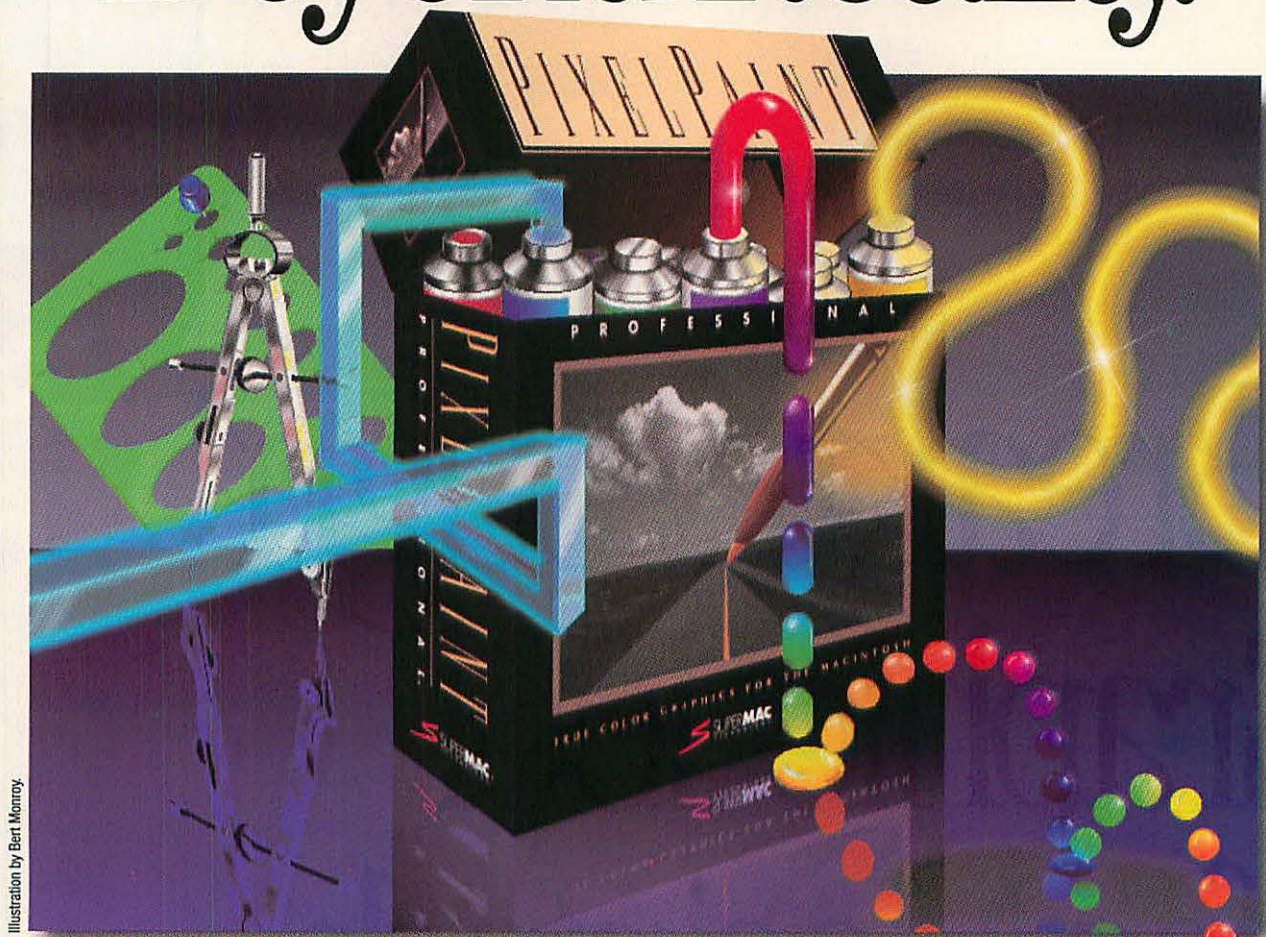


Illustration by Bert Monroy

Image created entirely in PixelPaint Professional with a Spectrum/24™ graphics card.


As a designer, you need tools as unlimited as your imagination. You need PixelPaint Professional™, the first True Color paint program. It lets your imagination tinker with reality. Not just image processing, but image *creation*.

PixelPaint Professional gives you all the traditional paint tools you're used to, and a vast selection of advanced tools for dazzling special effects. Like ultra-smooth graduated fills and anti-aliasing. Full transparency control. Dynamic masking. And the most sophisticated airbrush around. You can choose from a nearly endless spectrum of custom palettes, and seven different color pickers. Including 4-color process, RGB, and PANTONE®*Color.

And PixelPaint Professional is a universal paint program. It supports any color depth from 8- to 32-bits—so you don't have to buy new software when you upgrade from 8- to 24-bit hardware.

So if you design anything on the Macintosh®, then take your imagination beyond reality with PixelPaint Professional. Ask for it by name at your local SuperMac Software reseller.



A photograph of a classic Macintosh computer. A white Wacom cordless stylus is resting on the keyboard. The screen displays a colorful graphic with a blue background and a yellow and red abstract shape.

A “Breakthrough” Graphic Tool for Macintosh Artists

The Wacom cordless, pressure-sensitive stylus.



MAC

NIFICENT SAVINGS!

Get **MACWORLD**
for just

\$1.50

per
issue!

YES

Please enter a subscription to **MACWORLD**
in my name for the term indicated below:

BEST Deal!

- ☐ 3 years (36 issues) —
\$54.00 (\$1.50 per issue)

Name _____

GREAT Deal!

- ☐ 2 years (24 issues) —
\$37.90 (\$1.58 per issue)

Company _____

GOOD Deal!

- ☐ 1 year (12 issues) —
\$24.00 (\$2.00 per issue)

Address _____

City/State/Zip _____

☐ Please bill me. ☐ Payment enclosed.

Allow 4-6 weeks for delivery of the first issue. Basic subscription price is \$30 for 12 issues. The cover price is \$3.95 per issue, \$47.40 annually. For Canada and Mexico, please add \$18 shipping.

**Subscribe now
and SAVE \$\$\$!**



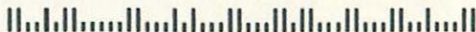
NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1167 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

**Macworld
Subscription Department
P.O. Box 51666
Boulder, Colorado 80321-1666**





The Mac has always had great potential in graphic arts. But until now, no one has really provided a tool to unleash it. There has always been some form of mechanical trade-off imposed by input devices that inhibited artists from letting their imaginations flow naturally.

Now, Wacom introduces a totally "real" graphic tool, one that let's you interact with the Mac as intuitively as you would with a canvas. With Wacom's cordless, pressure-sensitive stylus your will is converted through manual pressure to line width, spray, color change and other programmable effects. This allows you to create "real time" artistic images free of the artificiality and limitations of other input devices. And since the Wacom stylus has neither cable nor battery, it is also ultra-light and maintenance free.

Wacom, a leading name in computer graphics worldwide with proven man-machine interface technology, invites you to a new era in Macintosh graphics with a promise:

Once you experience it, you'll never look back.

Performance/Specifications • Resolution: 1,270 lines/inch (0.02mm) • Accuracy: ± 0.01 inch (± 0.25 mm) over entire active surface • Maximum reading speed: 205 points/second

Wacom SD-Series Digitizers • A0 to A5, square or rectangular • Surface types: standard, magnetic, electrostatic, or transparent menu panel • Pointing devices: Pressure-sensitive, stroke-type or nonstroke-type cordless stylus, 4-button or 12-button cordless cursor.

WACOM

WACOM Inc.

West 115 Century Road, Paramus, NJ 07652, U.S.A.
Tel: (1) 201-265-4226, Fax: (1) 201-265-4722

WACOM Computer Systems GmbH:

Hellersbergstrasse 4, D-4040 Neuss 1, West Germany
Tel: (49) 2101-16001, Fax: (49) 2101-101760

WACOM Korea Co., Ltd.

371-36, Karibong-Dong, Kuro-Gu, Seoul, 152-020 Korea
Tel: (82) 2-869-5595, Fax: (82) 2-869-1241

WACOM Co., Ltd.

International Division

4-1-12, Ikebukuro, Toshima-ku, Tokyo, 171 Japan
Tel: (81) 3-985-0097, Fax: (81) 3-985-8636

WACOM is a registered trade mark of WACOM Co., Ltd.
Copyright © 1990 by WACOM Co., Ltd. All rights reserved.

Circle 507 on reader service card

This Ad isn't Big Enough!

This ad was created on a Mac II using Aldus PageMaker 3.02, Adobe Illustrator 1.83, Silicon Beach Digital Darkroom, the text was set with the Futura & Futura Condensed families from the Innoce Club Typeface Library and output as negatives on a Linotronic L3000 PostScript imagesetter.

They just won't fit onto one page. This is the Image Club PostScript Typeface Library. 600 licensed "brand name" typefaces compatible with your Mac or PC and any PostScript printer. The typefaces are available on floppy diskettes in separate families as illustrated here or the entire library of 600 faces on our new Letterpress CD ROM (available for the Mac only).



The Letterpress CD ROM features a special program developed by Image Club that unlocks typefaces as they are required on the CD ROM. The Letterpress CD can be obtained for as little as \$199 including 10 fonts. Purchasing additional fonts from your Letterpress is as easy as making a phone call. We will provide a key number that is used to unlock the new typefaces from the disc.

Also included with every font is a PostScript artwork file that you can use with Adobe Illustrator or Aldus FreeHand. Modify, rotate, stretch, customize and create your own headlines, logos and type based artwork.



Whether you buy fonts on diskette or from the Letterpress CD ROM, our pricing and discount schedule will make it even easier.

Each font \$25. Minimum purchase \$50.

Please note that typeface families cannot be split up.

Discount schedule:

10-30 fonts 20% off	131-210 fonts 35% off
31-70 fonts 25% off	211-300 fonts 40% off
71-130 fonts 30% off	

Letterpress CD ROM full disc (all 600 fonts)	\$4999
Letterpress full disc with NEC CD ROM drive	\$5599
Letterpress TypeVendor	\$199
(includes 20 fonts with 600 more ready to unlock)	

To view the entire library of 600 fonts (a single page just can't do it), call for your free catalog or order with our toll free line. Image Club accepts VISA, MasterCard and American Express.

For Orders Within the US Call
Fontline!
800.661.9410
For a Free Catalog or Orders Outside USA
(403) 262-8008





Out on a Sim

EXPLORING THE NATURE OF SIMULATION VERSUS REALITY

BY STEVEN LEVY

I like to think that it was something more than idleness that recently led me to lock myself in a bedroom for 14 consecutive hours, interacting with a software program called SimCity. A worried human being pounded on the door—"Are you

all right in there? Are you all right?"—but I must admit that human beings of the corporeal persuasion were the farthest thing from my mind.

Instead, I was concerned about, well, pseudo-human beings. Little *faux* creatures that my screen didn't even display, but only implied. I could see evidence of their existence, though, in Lower Gomorrah, the city I controlled. These virtual people, called Sims, moved into houses and often upgraded them to nicer homes. Sometimes, when the neighborhood got too crowded, they let the places go to seed. They drove around in little cars that got stuck in little traffic jams, at which time tiny helicopters making not-so-tiny chopping noises hovered overhead, announcing gridlock. The Sims even attended football games in the stadium they had demanded for this burgeoning burg—the games lasted about five seconds (Note to NFL: hire Sim referees), and then the Sims would jump into their cars and zip over to another traffic jam. It was up to me, the city planner who had omnipotent control over zoning, budgeting, tax rates, and municipal construction in Lower Gomorrah, to keep the Sims happy. Otherwise they'd move out, and my personal metropolis would no longer thrive.

Anyway, that's the scenario of

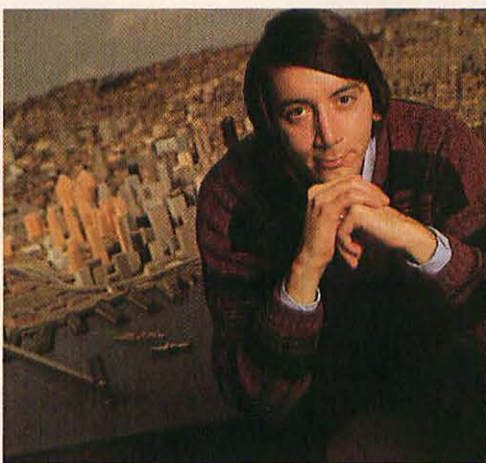
that looked like a city and felt like a city, was I really manipulating anything that bore formal resemblance to a city? I hear that supposedly legitimate city planners are tinkering with SimCity; it's being used in college courses as an educational modeling tool. Is this a valid practice, or are these folks tricked by an illusion? How relevant is the imitation to the real thing?

Obviously, an imitation of a thing is not the same as the thing itself. It's a metaphor, something that emphasizes a particular similarity of one aspect of the original to the object in question. When you compare a colleague to a pig, probably you're referring to that person's undisguised eagerness to sate various hungers, or perhaps an unfortunate lack of cleanliness. Chances are you're not implying that

the person walks on all fours.

But it is the nature of computer simulation to generate a fuzziness at the edge of metaphor. If we can extract some nugget of validity from using SimCity—if it has any value at all to people thinking about cities and zoning—how can we know how *much* it applies? And how do we know when the metaphor does not apply at all?

We need to understand this problem in order to make sense of a new breed of simulation, one that attempts to give us a political understanding of an aspect of the world. Hidden Agenda, another terrific Mac Game (continues)



Some call him an artist, but SimCity creator Will Wright demurs.

SimCity, a computer game you've probably heard about: it has sold lots of copies, and last December it won the highest honor on earth, inclusion in the *Macworld* Game Hall of Fame. But what brings me to address it at this late date is a mental obsession I've been grappling with lately, one that is proving as compelling a passion as the one I indulged in my SimCity binge.

Accepting No Substitutes

The obsession deals with the nature of computer simulation itself. Everything boils down to this: When I was running Lower Gomorrah, something

LESLIE FLORES

MacPAIN RELIEF

OH DOOM GLOOM MISERY AND DISPAIR! I SHOULD HAVE QUICKOR KARE!

LOST WORK
UNPAID BILLS
STRESS
UNEXPECTED EXPENSES
DOWN TIME
A REAL PAIN IN THE SOFTWARE!
90 DAY WARRANTY
A REAL PAIN IN THE SOFTWARE!
LOST INCOME
QUICKOR KARE! BETTER PROTECTION TRANSFERRED
FAST DELIVERY PICKUP DAY!

Quickor Kare
EXTENDED SERVICE POLICY
OR APPLE CARE

THE CHOICE IS EASY!

- 1 COST** Quickor Kare gives **TWICE** the coverage at **HALF** the cost!
- 2 SERVICE** Quickor Kare provides nationwide **OVERNIGHT REPLACEMENT!**
- 3 VALUE** Quickor Kare is the **ONLY** extended service policy that actually **REPAYS YOU!** (Call for details!)
- 4 COVER-AGE** Quickor Kare protection is available on **ALL Mac products and peripherals!**

Mac Friends

WATCH FOR OUR ADS ON PAGES # 28, 250, 193

Quickor Kare is available on **ANY** new purchase (within 90 days) from participating dealers.

CALL NOW

800-331-1322

© CompuShare, Inc. 1992. Mac, Macintosh, AppleCare, Apple Computer, Inc. Quickor Kare™ CompuShare, Inc.

Circle 109 on reader service card.

Hall of Famer released last year, puts the user in the Presidential Palace of Chimerica, a virtual country in Central America. As the new Presidente, the user is forced to balance the demands of representatives of competing factions. There are threats from the left and from the right, and all too often the user will fail to keep the dogs of war at bay. The horrified user may be the victim of a coup, or assassinated. Or the user may be shocked to find him- or herself a survivor, but one in charge of a soulless, overcompromised nation. In any case, the intent is to give the user the impression that Central American reality is similar to the reality of Hidden Agenda. If not, the learning experience is misleading, perhaps even intentionally. Simulations of this nature, after all, hold potential for insidious propagandizing.

It's not an idle pursuit to wonder about the relationship of simulation to reality. Simulations of this sort (one hopes more sophisticated) are run on government computers to help determine national policy on big issues like national defense and budgeting. So we have an interest in finding out the relevancy of such simulations, and their potential for transmitting bias on behalf of the designer.

Yeah, but Is It Art?

To shed some light on this, I visited Jim Gasperini in his New York City apartment; he's the guy who, along with Trans Fiction Systems, designed Hidden Agenda. He assured me that he had not stacked the deck to support a particular political bent. As evidence he claims that the game has been attacked from people on both ends of the political spectrum: leftists complain that the game is too pragmatist, righties think Gasperini is a pinko. But he acknowledged that there is no way he could create a simulation free of any of his biases. After some discussion he admitted that his view of the political situation was indeed reflected in Hidden Agenda: he believes Central America is a complex conundrum where compromise is inevitable, and so it is in the game.

Of course, in order to endow the simulation with authenticity, Gasperini had to learn a lot about the subject. Ultimately, he had to winnow out

some of the complexities: out went various ethnic tensions, and any aspects of Chimerica's relations to its neighbors. Meanwhile, he kept concepts like land reform, death squads, and relations to the superpowers. "You strive to maintain verisimilitude, but you don't want to sacrifice comprehensibility," Gasperini explains.

Now hard at work writing *Pere-stroika*, a simulation of an Eastern European country, Gasperini made an interesting claim. Creating simulations—choosing which aspects are essential to include—is an art form, he said. Novels are a form of simulation, using paper. Movies are simulations that use images. Computer simulations are simply a more interactive form of narrative. Well, I asked him, what about *SimCity*, a simulation that has no pretense to narrative, but which allows you some control over a silicon organism called a city? Is its creator, Will Wright, also an artist? "Will doesn't think of himself as an artist," said Gasperini. "I'm trying to convince him he is."

The Wright Stuff

I figured out that I should ask Will Wright for myself, so I ventured to the programmer's study, in his Berkeley, California, home. Like Gasperini, Wright does not claim that the prodigious research that went into his particular simulation—he read 50 books on city planning—means that one can extrapolate too much from *SimCity*. "I wouldn't want to predict a *real* city with it," he says. Yet he notes with some pride that city planners have embraced the game as a tool for understanding cities, and that Maxis Software has published a teacher's guide to the program.

In doing simulations like *SimCity*, Wright sees himself as a popularizer of otherwise arcane subjects. "SimCity has been more educational for me than for the users," he says. "I guess I'm more of a synthesizer [than an artist]."

We talked for a while about the nature of simulation and agreed that after a certain point something like *SimCity* has a life of its own. It is a city—just not a real one. And that is at the heart of my interest in the nature (continues)

PRINTS GREAT. LESS SHILLINGS.

THE NEW \$1399 PLP II.

Now you can have everything you ever wanted in a laser printer. Without paying the price.

Introducing the lowest priced laser printer in history: the \$1399 PLP™ II from

The Highest Quality Printing.

Because PLP II includes 6 outline font families (for a total of 22 individual fonts), its razor-sharp, clean output can be

or 10 AM to 4 PM (EST) on Saturdays. Our trained staff can answer your questions and offer advice on any of our products. (Be sure to ask for our free catalog.) Orders received by 8 PM (EST) will be shipped the



GCC Technologies. GCC developed the very first personal laser printer in 1987, and has over 10,000 satisfied users... more than everyone else combined.

Finally, a revolutionary printer at a revolutionary price. In fact, at \$1399, it's nothing short of a technological marvel.

Personal Desktop Printing.

Three years of research and development have put the finest printer technology right on your desktop: a combination of the newest third generation laser engine, GCC's own custom designed integrated circuits, and the market's most sophisticated QuickDraw™ imaging software yet.

Features such as a silent "sleep" mode, a very user-friendly LCD display and an envelope printing desk accessory have been carefully integrated to create a laser printer that truly is personal.

shaped, scaled, and rotated to any point size — all at a full 300 dpi.

These outline fonts, combined with GCC's powerful QuickDraw imaging software, give you unlimited flexibility in producing perfect documents from such applications as PageMaker,* Word,* Excel,* MacWrite,* MacDraw,* Persuasion,* and Canvas.*

Dealer or Direct: Your Choice.

GCC has made acquiring your new PLP II just as easy as using it. If you would like to see a demonstration and purchase your PLP II today, simply visit one of GCC's authorized dealers. For the location of the dealer nearest you, call

800-422-7777.

To order direct from GCC, call us toll-free from 9 AM to 8 PM (EST) on weekdays,

same day via overnight delivery for only \$9.

What's more, when you buy direct from GCC we guarantee satisfaction. If after trying PLP II for up to 30 days you aren't completely satisfied, return it and we'll cheerfully refund your money.

One Year Warranty.

PLP II carries a full one year warranty on parts and labor. We also offer repair service at any Xerox® carry-in service center, or at any one of hundreds of GCC Technologies dealers.

PLP II. \$1399.

We gladly accept MasterCard, Visa, American Express, or your company's corporate purchase order.

**GCC
TECHNOLOGIES**
Peripherals with Vision.™

GCC dealers are independent businesses and as such they may offer different prices, policies, and service arrangements. In Canada 800 263-1405 ©1989 GCC Technologies, Inc.

Circle 204 on reader service card

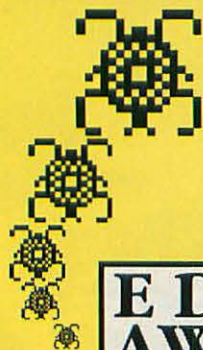
Ad 020047

CRYSTAL

Quest™

**"Best Action
Game
of 1988" -MACWORLD**

**Crystal Quest
WITH
CRITTEREDITOR™**



**EDDY
AWARD**



**1989 WINNER
Mac User**

**Best
New
Recreation Program**

Make Your Own Game!

Crystal Quest: \$49.95
Crystal Quest & CritterEditor: \$79.95

Casady & Greene Inc.

POB 223779, Carmel, CA 93922
Information: (408) 624-8716
Orders: (800) 331-4321
In CA: (800) 851-1986

Circle 134 on reader service card

of simulations. Not what they profess to address—those implicit claims to educational value or eye-opening exposure to some hitherto foreign point of view—but the separate realities they generate. Simulations are real things, in and of themselves.

And though simulations are not identical to the things they simulate, they can produce behavior that is not merely similar to things in the real world, but identical. For instance, Craig Reynolds, a graphics programmer at the Symbolics Company, has created a simulation using boids, little birdlike constructs. After much observation of flying birds in formation, he surmised certain rules for flocking, then programmed his boids to follow those rules. And without being specifically programmed to do so, the boids flew in convincing formation! Scientists studying the phenomenon now say that Reynolds's simulation does not merely imitate the behavior of real birds—in a genuine sense, *they are actually flocking*.

Since "real" behavior can come from simulation, then simulations are indeed objects worthy of examination; lessons can be drawn from them. Whether those lessons apply to other objects—"real" ones, if you will—can only be determined by experimentation. Best of all, simulations can generate insights that might one day be verified as valuable knowledge.

Lives of a Cellular Automaton

For support of this (not particularly original) thesis I invoke a class of simulations known as cellular automata (CA). These are simple mathematical constructs with deceptive significance. Most commonly, they begin with a checkerboard-like grid laid upon the "world." Each square is called a cell, and each cell is assigned a given state. Often these are limited to two possible states, on or off. The simulation begins by going to the next generation: depending on the state of its various neighbors, a cell may or may not change its state in this new configuration. (This is determined by a set of rules drawn up beforehand.)

The best known CA simulation is one devised by mathematician John Conway, called Life. Although the rules are insanely simple, the behavior of

the cells once the generations turn is tremendously, spellbindingly complex. Some scientists, notably Stephen Wolfram (known to some Mac users as the maestro of Mathematica), argue that this characteristic of CAs points to a profound physical understanding of the nature of the complexity in the Universe itself. More daringly, a brilliant scientist named Ed Fredkin, who once headed MIT's prestigious Project Mac artificial intelligence lab, has postulated in all seriousness that our universe, the biggest of all possible imaginable enchiladas, is itself a giant cellular automaton—a simulation.

(Incidentally, there is a wonderful set of computer programs published by Autodesk called Rudy Rucker's Cellular Automata. Tragically, Autodesk offers these marvels only in the MS-

**Simulations can
produce behavior
identical to that of
the real world**

DOS format, and the program is useless to Mac owners.)

Are we getting far afield here? No—this leads to the ultimate justification for my SimCity binge. SimCity, it seems, shares many features of a deeply interesting cellular automaton. The various zones of the city adjust their behavior partially as a consequence of the state of their neighbors. Just as CAs can give us clues to the nature of behavior, so can SimCity reveal to us some of the hidden agendas, so to speak, of cities. When I asked Will Wright whether SimCity had uncovered any such aspects, he said, yes, there was one thing in particular that routinely occurred in the simulation, even though it had never been programmed into it. This was the deterioration of some inner-city areas when they became congested or surrounded by an inhospitable industrial area. Slummification. Just as in real cities, there was a principle that was triggered when conditions reached a certain point.

(continues)

FOR THOSE OBSESSED WITH PERFORMANCE, A HARD DISK THAT MATCHES YOUR OBSESSION.

Today there are any number of peripherals designed to push the performance envelope of the Macintosh.[®] But none pushes harder than an ingenious new series of hard disks from GCC Technologies.[™]

utilities package featuring data recovery, deleted file recovery, DES encryption security, and a powerful backup program.

You also get UltraWare,[™] GCC's own software package which includes a disk

return it and we'll cheerfully refund your money, no questions asked.

Two Year Warranty.

Finally, UltraDrive S carries a full two



Its name is UltraDrive[™] S: a complete family of 40 to 175 MB hard disks that relegates all others to the status of underachievers.

No Hard Disk Works Faster.

Simply stated, UltraDrive S is the fastest hard disk in its class. A distinction made possible by an on-board RAM cache that speeds access to recent or sequential data requests. By a capability called 'one-to-one interleaving' that feeds you data as fast as your Macintosh can take it. And by amazing average access times as low as 12 ms.

All of which is good news indeed for anyone who works with large spreadsheets, sophisticated graphics or other data-intensive applications.

No Hard Disk Works Smarter.

Each UltraDrive S hard disk comes with an extensive software library ordinarily retailing for several hundred dollars. Including Symantec's[®] SUM II, a comprehensive

In Canada, (800) 263-1405 © 1989 GCC Technologies, Inc.

management program featuring true SCSI partitioning (Disk Manager[™]), a rapid print spooler (QuickSpool[™]), and over 3 MB of selected shareware software.

In sum, to anyone obsessed with performance, UltraDrive S provides an ideal vehicle for self-expression. And at a price over 35% less than Apple's[®] hard disks, it even performs better as an investment.

Toll-Free, Hassle-Free, Risk-Free.

To order, call 800-422-7777 from 9 to 9 on weekdays, or 10 to 4 Saturdays. Our expertly trained staff will be glad to answer questions, provide technical support, and offer advice on choosing and getting the most out of any of our products. Ask for our free catalog. When your order is received by 8:00 PM (EST), it will be shipped the same day via overnight delivery for only \$9.

What's more, we *guarantee* satisfaction. If after trying UltraDrive S for up to 30 days you aren't completely satisfied, just

year warranty covering both parts and labor (ask for details). But that's not the only way we ensure your peace of mind. We also offer repair service at any one of hundreds of GCC Technologies dealers.

The UltraDrive S Series.

MODEL	EXTERNAL	INTERNAL
UltraDrive 40 S	\$799	\$649
UltraDrive 80 S	\$1099	\$949
UltraDrive 100 S	\$1299	\$1149
UltraDrive 175S	\$1799	\$1699

For the name and location of the GCC Technologies dealer nearest you, or

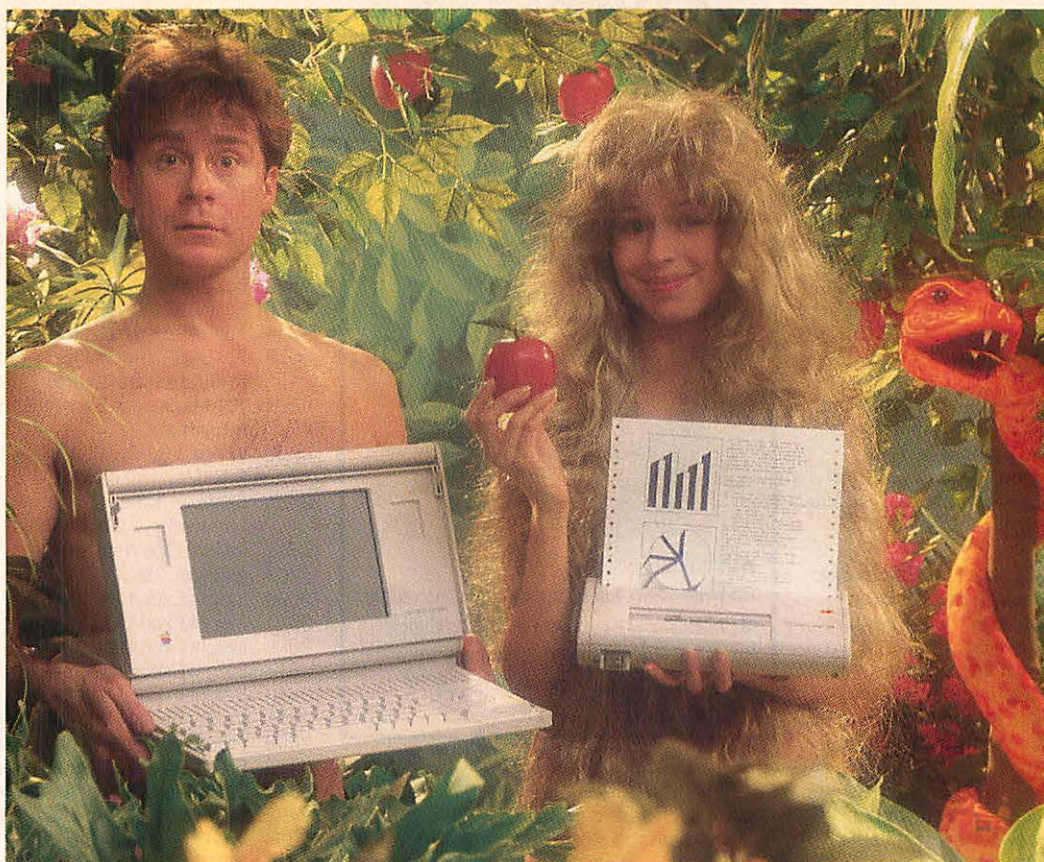
To Order, Call 800-422-7777.

We are glad to accept MasterCard, Visa, American Express, or your company's corporate purchase order.

 **GCC
TECHNOLOGIES**
Peripherals With Vision.[™]

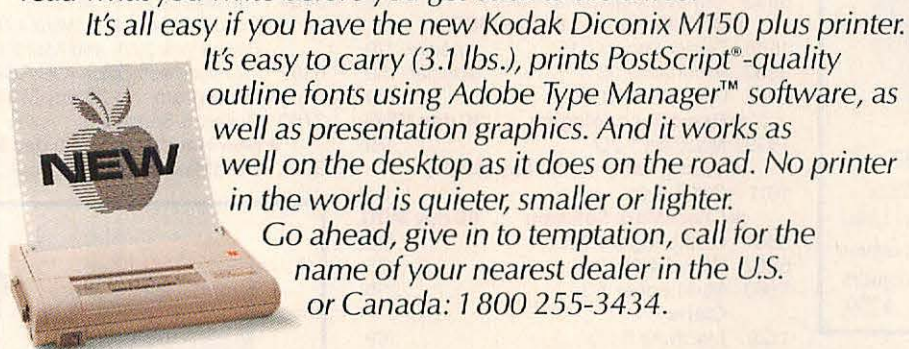
Macintosh computer and new Kodak Diconix printer

**WHAT'S
ONE
WITHOUT
THE OTHER?
KODAK**



Introducing the Kodak Diconix M150 plus printer. Don't take a Mac anywhere without one. Now you can print out a sudden revision, a quick letter, an instant overhead anywhere!

Just think of all the things you can do if you have a printer with your Macintosh computer. Those last-minute improvements on the presentation. And the letters and reports that could be on their way right now. Then there's the sheer convenience of being able to read what you write before you get back to the office.



It's all easy if you have the new Kodak Diconix M150 plus printer. It's easy to carry (3.1 lbs.), prints PostScript®-quality outline fonts using Adobe Type Manager™ software, as well as presentation graphics. And it works as well on the desktop as it does on the road. No printer in the world is quieter, smaller or lighter.

Go ahead, give in to temptation, call for the name of your nearest dealer in the U.S. or Canada: 1 800 255-3434.

The new vision of Kodak



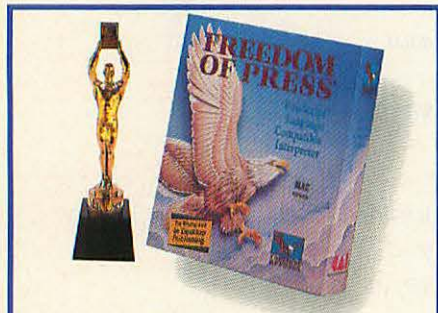
This month we

Up here in the north country we think all our products are winners. Nevertheless, we are pleased as punch for those of them who were nominees, honorable mentions, and winners in the 5th annual *MacUser* Editors' Choice (Eddy) Awards. You'll find many of them pictured in our product listing this month.

Last month we announced that our order line is now open until 1 AM. Well, this month's news is that our toll-free number (800/334-4444) now works in Canada. So all of you who live even further north than Marlow can call us toll-free. Pretty cool, eh?

The majority of products we carry are covered by 30-60 day Money Back Guarantees (as listed here in red). If you're not happy with one of those products, call us for an authorization and return it with all of the original packaging within the guarantee period for a refund check (or credit on your credit card). We reserve the right to limit quantities on such returns.

Version numbers in our ads are current at press time. You will receive the latest version when you order, because that's all we sell. Also, all software is not copy-protected, unless indicated otherwise by (CP). Finally, please refer to the four-digit number next to the product when ordering. Thanks!



Custom Applications ... 30 day MBG
Freedom of Press 2.1A—1990 *MacUser* Editors' Choice Award for Best Graphics/Publishing Utility and Honorable mention for Most Significant Software Product. "Brings PostScript-printing capabilities to non-PostScript output devices"..... \$259.

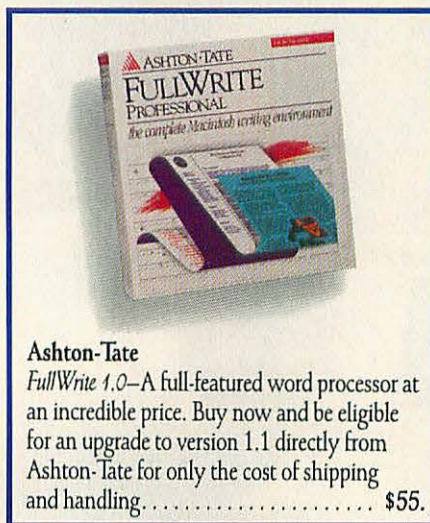
BUSINESS

★Aatrix Software ... 30 day MBG

- 5872 Checkwriter II 2.2 37.
- 3976 Aatrix Payroll 3.5 109.
- 3958 Aatrix Payroll PLUS 3.1 175.
- 4021 Aatrix TimeCard 2.1 119.
- 4020 Aatrix TimeMinder 2.1.2 175.

★Abacus Concepts ... 30 day MBG

- 4482 StatView SE+Graphics 1.03 179.
- 4481 StatView II 1.03 279.
- 5840 SuperANOVA 1.1 (for Mac Plus/SE) . . . 465.
- 5904 SuperANOVA 1.1 (for Mac II) 465.
- 5906 SE+Graphics/SuperANOVA bundle 595.
- 5907 StatView II/SuperANOVA bundle . . . 695.



Ashton-Tate

FullWrite 1.0—A full-featured word processor at an incredible price. Buy now and be eligible for an upgrade to version 1.1 directly from Ashton-Tate for only the cost of shipping and handling. \$55.

★Acius ... 30 day MBG

- 5618 4th Dimension 2.0 469.
- 4024 4th Dimension Runtime 2.0 229.

★Advanced Software ... 30 day MBG

- 5608 DocuComp 1.11 89.

A Lasting Impression

- 5465 ResumExpert 39.
- 5749 Cover Letters 39.
- 5853 Sales & Marketing 39.
- 6363 Computer Science & Engineering . . . 39.
- 6374 Finance & Banking 39.
- 6364 Students 39.
- 5852 Management Edition 39.

Ashton-Tate

- 1324 FullWrite 1.0 (special, see box above). 55.

Blyth Software

- 5492 Omnis 5 347.
- 5855 Omnis 5 (Additional 1 user) 59.

★BrainPower ... 60 day MBG

- 1535 DesignScope 1.15 special 119.
- 3960 ArchiText 2.03 special 159.
- 6362 Statalyzer 1.0 179.

★Bravo Technologies ... 30 day MBG

- 1539 MacCalc 1.2D 79.

★Chang Labs ... 30 day MBG

- 1611 C.A.T. 2.0 call

★CheckMark Software ... 60 day MBG

- 5861 CashLedger 1.3A 115.
- 5862 Payroll 4.02 175.
- 5863 MultiLedger 1.3 235.

Clarix

- 1129 MacWrite II 1.0 169.
- 4196 FileMaker II 1.1V2 219.
- 5910 FileMaker II & MacWrite II Bundle . . . 295.
- 1125 MacProject II 2.0 369.

Computer Associates/Bedford

- 4977 Simply Accounting 1.04 225.

★DacEasy Software ... 60 day MBG

- 4502 DacEasy Light 1.0 42.

★Deneba Software ... 30 day MBG

- 4700 BigThesaurus 1.0 64.
- 1767 Comment 2.0 64.
- 1768 Coach Professional 3.1 125.

★Digital, Etc. ... 30 day MBG

- 6378 Business Sense 1.2 269.

★Dow Jones ... 30 day MBG

- 1786 Market Manager PLUS 2.0 189.
- 6383 Market Analyzer 189.

★Electronic Arts ... 30 day MBG

- 1543 Thunder II 1.01 (Batteries Included) \$49.

★Fox Software ... 30 day MBG

- 5572 FoxBASE II/Mac 2.0 295.
- 4580 FoxBASE +/Mac Runtime 2.0 179.
- 4844 FoxBASE +/Multi-User 2.0 399.
- 5579 FoxBASE +/Multi-User Runtime. . . 295.

Individual Software

- 4720 101 Macros for Excel 1.5 35.

Informix

- 4955 Wingz 1.1 249.

★Intuit ... 30 day MBG

- 2425 Quicken 1.5 36.

★Layered ... 30 day MBG

- 2613 Insight OneWrite 1.0 85.
- 5207 atOnce! 1.0 285.
- 2609 Insight Expert A/P 2.02 395.
- 2610 Insight Expert A/R 2.2 395.
- 2611 Insight Expert G/L 2.1 395.
- 2612 Insight Expert Inventory 1.01 395.
- 5643 Insight Expert Payroll 1.0 395.
- 2614 Insight Expert Time Billing 2.01 . . . 395.
- 2608 FrontDesk Multi-User (single node) . . 59.
- 6372 FrontDesk Multi-User (1-3 nodes) . . 134.
- 6373 FrontDesk Multi-User (1-10 nodes) . . 299.

★Lundeen & Assoc. ... 60 day MBG

- 2684 WorksPlus Spell 2.0A 56.

★MECA ... 60 day MBG

- 2796 Managing Your Money 3.0 124.

★Microlytics ... 60 day MBG

- 2733 WordFinder 2.0 34.

- 4870 Electronic WordFinder 220 special 59.

★Microsoft ... 30 day MBG

- 2885 Write 1.0 79.
- 2866 File 2.0A 125.
- 2884 Works 2.0 185.
- 4969 Word 4.0 249.
- 2865 Excel 2.2 249.
- 6500 MS Excel Money Manager Book (282 pages, includes disk) 25.

- 5454 The Microsoft Office (includes Excel 2.2, Word 4.0, PowerPoint 2.01, and Mail 2.0) . . . 529.

- 6382 The Microsoft Office (CD-ROM) . . . 599.

★Monogram ... 30 day MBG

- 2780 Dollars & Sense 5.0 81.

★New Horizons ... 30 day MBG

- 6262 WordMaker 1.0.1 65.



Layered ... 30 day MBG

atOnce! 1.01—1990 *MacUser* Editors' Choice Award for Best Accounting Package. "Superb integrated GL, AR, AP, and payroll system for small businesses. Automatic posting routines, password security, custom report writer" \$285.

feature the Eddies.



DeltaPoint ... 60 day MBG
DeltaPoint 1.0—1990 MacUser Editors' Choice Award for Best Presentation Product. A charting package with the flexibility and power to create captivating charts and dramatic graphics, all in one program \$99.

★Niles & Associates ... 30 day MBG

5048	EndLink 1.0	58.
4602	EndNote 1.2.1	75.
5101	Grant Manager 1.75	249.

★Nolo Press ... 60 day MBG

4228	For the Record 1.03	28.
2981	WillMaker 3.0	32.

★Odesta ... 30 day MBG

3014	GeoQuery 1.01	198.
5621	Double Helix III 3.0	339.
6468	DataDesk 3.0	349.

Paracomp

4664	Milo 1.0	158.
------	----------	------

★Paragon Concepts ... 30 day MBG

5683	Nisus 2.03	249.
------	------------	------

★Preferred Publishers ... 30 day MBG

4781	Vantage 1.5	52.
4780	DAtabase 1.5	68.

★ProVUE ... 60 day MBG

4582	Panorama 1.5	249.
------	--------------	------

★Reference Software ... 30 day MBG

6268	Grammatik Mac 1.0	52.
------	-------------------	-----

Satori

3320	BulkMailer 3.25	75.
3321	BulkMailer Plus 3.25	179.
3978	Components G/L	369.
6109	Components A/R	369.

★Sensible Software ... 30 day MBG

3375	Sensible Grammar 1.5.5	53.
4692	Bookends 1.1.7	53.

★Softstream Int'l., Inc. ... 60 day MBG

5439	Endeavour Planner 1.0	95.
------	-----------------------	-----

SoftView

3470	MacInTax 1989 1040	65.
6430	MacInTax & Quicken Bundle	95.
6496	MacInTax 1989 Professional 1040	359.
3473	Taxview Pro. Planner 1989	215.
6497	California State 1989	56.
6495	Massachusetts State 1989	56.
6498	New York State 1989	56.

Additional States available

(CT, IL, NJ, OH, VA) each \$56.

★Survivor Software ... 30 day MBG

6097	InvoicIt	49.
3289	MacMoney 3.5	59.

★Symantec ... 30 day MBG

3422	More II 2.01	special 239.
------	--------------	--------------

★Symmetry ... 30 day MBG

4504	Acta Advantage 1.0	64.
6069	KeyPlan	199.

★Synergy ... 30 day MBG

3129	KaleidaGraph 2.0	145.
------	------------------	------

TENpoint0

4638	Focal Point II	117.
------	----------------	------

★Timeslips ... 30 day MBG

(formerly North Edge Software)

2986	Timeslips III 1.1	169.
------	-------------------	------

★T/Maker ... 30 day MBG

3639	WriteNow 2.0	119.
------	--------------	------

★WordPerfect ... 60 day MBG

3800	WordPerfect Mac 1.0.3	229.
------	-----------------------	------

★Working Software ... 30 day MBG

3790	Lookup 2.0	35.
3788	Findswell 2.0	35.
3792	Spellswell 2.2	44.
4699	QuickLetter 1.02	72.

GRAPHICS & DESIGN

AAPPS

6509	MicroTV	265.
------	---------	------

Adobe Systems

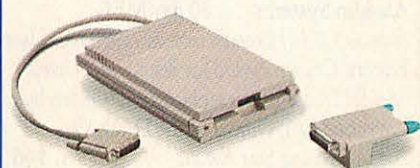
5750	Adobe Type Manager	56.
6053	Adobe Plus Pack	109.
6156	Adobe ATM/Plus Pack	special 159.
1137	Adobe Illustrator '88 1.9 (w/ATM)	279.
1138	Collector's Edition I (Symbols, etc.)	79.
4816	Collector's Edition II (Patterns, etc.)	129.
5606	TrueForm Fill-Out 2.0	169.
5605	TrueForm 2.0	225.



Altsys

Metamorphosis—A powerful utility that quickly converts your PostScript fonts into outline formats editable in programs like Fontographer, Aldus FreeHand, Adobe Illustrator, TypeStyler, and Quark XPress. \$149.

5001	StreamLine 1.0	\$229.
1142	Publishing Pack 1: Newsletters	229.
4565	Pub. Pack 2: Forms and Schedules	279.
4566	Publishing Pack 3: Presentations	279.
<i>MacConnection carries the entire Adobe Type Library volumes 1-122. call</i>		
4030	6 Optima	125.
4092	9 ITC Garamond	125.
4094	13 Helvetica Light/Black	125.
4093	14 Helvetica Condensed	239.
4041	20 Goudy Old Style	125.
4091	34 Aachen/Roman/Revue	125.



Kennet Technology ... 30 day MBG

Drive 2.4 & Rapport—Honorable mention—1990

MacUser Editors' Choice Award for Best Storage System. "Together they can cram 2.4 Megs' and 1.2 Megs' of data into high- and double-density drives respectively \$329.

★Aldus ... 30 day MBG

4751	Persuasion 2.0	329.
1330	Freehand 2.02	329.
1331	PageMaker 3.02	339.
6149	PageMaker Color Extension	135.

Altsys

1194	FONtastic Plus 2.02	51.
5425	Art Importer 2.0	89.
6499	Metamorphosis	149.
1195	Fontographer 3.0	249.

★Antic Software ... 30 day MBG

5756	FlexForm Bus. Templates I	special 45.
5760	FlexForm Bus. Templates II	special 45.

Bitstream

MacFontware Typeface Packages

5970	9 Futura Medium	89.
5976	11 Letter Gothic (12 Pitch)	89.
5974	15 ITC Garamond	89.
5975	16 ITC Souvenir	89.
5969	18 Bitstream Charter	89.
5973	19 ITC Galliard	89.
5971	20 Headlines 1	89.
5972	21 Headlines 2	89.
5968	23 Baskerville	89.
5977	27 News Gothic	89.

Bright Star Technology

3962	HyperAnimator 1.5	98.
6093	Interface 1.0	249.

150C

MMC
© 1990 MacMarketing Connection, Inc.

MacConnection™

MacConnection, 14 Mill Street, Marlow, NH 03456 1-800/334-4444 603/446-7711 FAX 603/446-7791

Products that are



Aladdin Systems ... 30 day MBG
Shortcut 1.0.1—Honorable mention—1990 MacUser Editors' Choice Award for Best General Utility.
"An INT/cdev finder replacement written by Raymond Lau, winner of the Derek Van Alstyne Rising Star Award" ... \$46.

Broderbund Software

- 1427 Print Shop 1.3.1 ... 35.
- 6281 TypeStyle 1.0 ... 119.

★Casady & Greene ... 60 day MBG

MacConnection carries the entire line of Casady & Greene fonts.

- Volumes 1-22 ... each 46.
- 4838 Quill Pack (Vol. 8 & 20) ... 89.
- 4836 Headline Pack (Vol. 10-12) ... 125.
- 4837 Modern Pack (Vol. 7, 14-18) ... 159.
- 4834 Distinctive Pack (Vol. 8, 19-22) ... 159.
- 4833 Classic Pack (Vol. 3-6, & 13) ... 159.
- 1575 Fluent Fonts 2.0 ... 27.

Claris

- 1123 MacPaint II 2.0 ... 95.
- 4815 Smart Form Designer 1.01V ... 295.
- 1117 MacDraw II 1.1 ... 295.
- 5911 MacDraw II & MacWrite II Bundle ... 369.
- 4814 Claris CAD 1.0 ... 595.

Computer Associates/Cricket

- 1668 Cricket Graph 1.3 ... 125.
- 1670 Cricket Presents 2.0 ... 285.

★Custom Applications ... 30 day MBG

- 6517 Freedom of Press 2.1A ... 259.

★DeltaPoint ... 60 day MBG

- 6095 DeltaGraph 1.0 ... 99.

★Deneba Software ... 30 day MBG

- 6365 UltraPaint 1.5 ... 125.
- 1769 Canvas 2.1 ... 189.

★DreamMaker ... 30 day MBG

- 4088 MacGallery (MacPaint format) ... 27.
- 4840 Cliptures: Business 1 ... 69.
- 4841 Cliptures: Business 2 ... 69.

Dubl-Click Software

- World-Class LaserType Vol. 1-9 ... each 42.
- 3972 World-Class Fonts! Originals ... 42.
- 3973 World-Class Fonts! Stylish ... 42.
- 3974 World-Class Fonts! Giants ... 42.
- 5131 World-Class Fonts! Triples ... 42.
- 3964 WetPaint Classic Clip-Art (1 & 2) ... 42.
- 3965 WetPaint For Publishing (3 & 4) ... 42.
- 3966 WetPaint Animal Kingdom (5 & 6) ... 42.
- 3967 WetPaint Special Occasions (7 & 8) ... 42.
- 3968 WetPaint Printer's Helper (9 & 10) ... 42.
- 3969 WetPaint Industrial Revol. (11 & 12) ... 42.
- 3970 WetPaint Old Earth Almanac (13 & 14) ... 42.
- 3971 WetPaint Island Life (15 & 16) ... 42.
- 4940 WetPaint All the People (17 & 18) ... 42.

★Electronic Arts ... 30 day MBG

- 5289 Studio/1 1.0 ... \$96.
- 4315 Studio/8 1.0 ... 296.

★Emerald City ... 30 day MBG

- 6098 TypeAlign for ATM 1.0 ... 60.
- 5168 Smart Art I 1.0 ... 84.
- 5602 Smart Art II 1.0 ... 84.
- 5603 Smart Art III 1.0 ... 84.

★Enabling Technologies ... 30 day MBG

- 1871 Pro3D 1.2 ... 279.
- Clip 3D (8 clip-art pkgs.) ... each 57.

★Farallon Computing ... 30 day MBG

- 4684 ScreenRecorder 1.0 ... 125.
- 2199 MacRecorder 2.0 ... 159.

★Foundation Publishing ... 60 day MBG

- 2385 Comic People ... 21.
- 2384 Comic Strip Factory 1.6 ... 38.

★Generic Software ... 60 day MBG

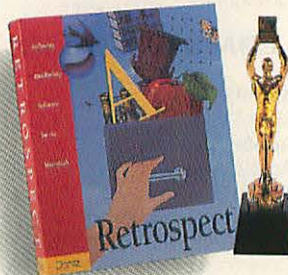
- 4319 Generic CADD Level 1 1.1 ... 84.

★Good Software ... 30 day MBG

- 5428 NuPaint 1.0.4 ... special 69.

★Graphsoft ... 30 day MBG

- 6502 Blueprint 1.0 ... 339.
- 4993 MiniCad + 2.0V4 ... 519.



Dantz Development ... 30 day MBG
Retrospect 1.1—1990 MacUser Editors' Choice Award for Best Backup Software. "Retrospect can quickly store data on almost every backup medium. It also makes backup chores as painless as possible" ... \$149.

★Great Wave ... 30 day MBG

- 2272 Crystal Paint 1.0 ... special 25.

Innovative Data Design

- 2417 MacDraft 1.2B ... 173.
- 4707 Dreams 1.0 ... 322.

Letraset

- 2621 Ready,Set,Go! 4.5 ... 275.
- 2619 Image Studio 1.5 ... 275.
- 4709 LetraStudio 1.5 ... 275.
- 6300 Font Studio ... 469.
- 6302 Design Studio ... 619.
- 6301 Color Studio ... 1589.

★Linguist's Software ... 60 day MBG

- Over 100 language fonts ... call
- 2630 Greek ... 59.
- 2636 Kanji 6.0 ... 59.
- 2625 Chinese Cantonese ... 79.
- 2645 Chinese Mandarin ... 79.
- 5759 LaserArabic & Farsi ... 59.
- 2641 LaserHebrew ... 79.
- 2640 LaserGreek ... 79.
- 2642 LaserKorean ... 89.

★MacroMind ... 30 day MBG

- 4953 VideoWorks II 2.0 ... 189.

- 4952 VideoWorks II HyperCard Driver 1.2 ... \$64.
- 4954 VideoWorks II Accel. 1.1 ... special 99.
- 6159 MacroMind Accelerator ... 125.
- 5087 MacroMind Director 1.01 ... 445.

★MicroMaps ... 30 day MBG

- 5516 MacAtlas (Paint version) ... 45.
- 5514 MacAtlas (EPSF version) ... 105.
- 5513 MacAtlas (Professional version) ... 105.
- 5515 MacAtlas Presentation Pack ... 105.

★Microsoft ... 30 day MBG

- 2878 PowerPoint 2.01 ... 249.

Mindscape

- 5768 ZING 1.0 ... 125.

Paracomp

- 4597 Swivel 3D 1.1 ... 299.

- 5028 ModelShop 1.0 ... 375.

★Preferred Publishers ... 30 day MBG

- 5751 Exposure 1.1 ... 52.

Quark

- 4621 QuarkStyle 1.0 ... call

- 3230 Quark XPress 2.12 ... call

★Silicon Beach ... 60 day MBG

- 3504 Silicon Press 1.1 ... 52.
- 3506 SuperPaint 2.0 ... 125.
- 3980 Digital Darkroom 1.1 ... 249.
- 3507 Super3D 2.0 ... 315.

★Softstream Int'l., Inc. ... 60 day MBG

- 4996 UltraSpec 1.0 ... 95.

★Solutions Int'l. ... 60 day MBG

- 3446 The Curator 1.05 ... 72.

★Springboard ... 30 day MBG

- 3530 Certificate Maker 2.0 ... 22.
- 3532 Certificate Library ... 18.
- 4497 Top Honors 1.01 ... 59.
- 4500 Springboard Publisher II ... 109.

★Strategic Mapping ... 30 day MBG

- 6511 Estatix ... 219.
- 6518 MapMaker 4.0 ... 289.

★SuperMac Software ... 60 day MBG

- 3380 PixelPaint 2.0 ... 225.
- 5625 PixelPaint Professional 1.0 ... 389.

★Timeworks ... 30 day MBG

- 5908 Publish-it! 1.1.1 ... 225.

★T/Maker ... 30 day MBG

- 3632 ClickArt Business Images ... 32.
- 3633 ClickArt Christian Images ... 39.
- 3635 EPS Illustrations ... 82.
- 5167 EPS Business Art ... 82.



Microsoft ... 30 day MBG
Excel 2.2—Honorable mention—1990 MacUser Editors' Choice Award for Best Spreadsheet.
"Enhanced interface, which adds interapplication communication with Mail 2.0"—Honorable mention (Best Communication Product) ... \$249.

tried, true, and steady.

3G Graphics

- 3942 Images with Impact: Graphics 1 ... \$51.
 4583 Images with Impact: Business 1 ... 65.
 ★Wayzata Tech. ... 60 day MBG
 6370 Quick Art (CD-ROM) ... 175.
 ★Wildflower ... 30 day MBG
 6512 SnapJot 2.0 ... 32.
 ★Zedcor ... 60 day MBG
 3986 DeskPaint & DeskDraw 2.01 ... 64.

PROGRAMMING & HYPERMEDIA

★Antic Software ... 30 day MBG

- 6100 HOT-SPOT ... 42.
Apple Computer
 1118 HyperCard 1.2.2 ... 42.
Bantam Publishing
 1403 Complete HyperCard Handbook ... 22.
 ★Beacon Technology ... 30 day MBG
 6426 Gems of The Word 1.0 ... 25.
 4967 HyperBible (King James) 1.0 ... 145.
 4968 HyperBible (New International) 1.0 ... 175.
Borland International
 1511 Turbo Pascal 1.1 ... 68.
 1512 Turbo Pascal Tutor 1.0 ... 46.
Broderbund Software
 5237 Whole Earth Catalog (CD-ROM) ... 89.
 ★Digitaltalk ... 60 day MBG
 5166 SmallTalk/V Mac 1.1 ... 125.

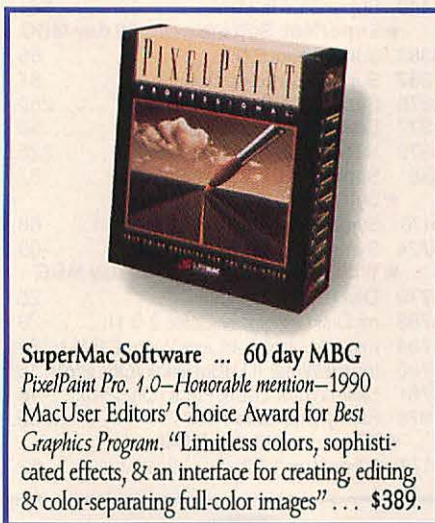


SoftView

MacInTax 1989 1040-1990 MacUser Editors' Choice Award for Best Personal Finance Package. "The most popular tax package for the Macintosh. SoftView offers an electronic filing service for fax and disk submissions" ... \$65.

★DreamMaker ... 30 day MBG

- 4115 MacGallery (HyperCard format) ... 27.
 ★Emerald City ... 30 day MBG
 5728 LaserTalk 1.0 ... 149.
Hyperpress Publishing
 4233 Icon Factory 1.0 ... 29.
 5089 Script Library 1.0 ... 29.
 6501 StepAhead 1.0 ... 57.
ICOM Simulations
 5681 HyperTMON 1.0 ... 59.
 4085 TMON 2.8.2 ... 87.



SuperMac Software ... 60 day MBG
 PixelPaint Pro. 1.0—Honorable mention—1990
 MacUser Editors' Choice Award for Best Graphics Program. "Limitless colors, sophisticated effects, & an interface for creating, editing, & color-separating full-color images" ... \$389.

Individual Software

- 4719 101 Scripts & Buttons HyperCard 1.0. 36.
 ★Manx Software ... 60 day MBG
 4075 Aztec C + SDB 3.6B ... 95.
 ★MicroMaps ... 30 day MBG
 5512 HyperAtlas ... 59.
 5518 QuickMap ... 59.
 ★Microsoft ... 30 day MBG
 4471 QuickBasic 1.0 ... 65.
 ★Millenium Software ... 30 day MBG
 6105 HyperX 3.0 ... 65.
 ★Now Software ... 30 day MBG
 (formerly SmethersBarnes)
 1478 Prototyper 3.0 ... 185.
Olduvai
 5446 PLUS 1.11 ... 109.
 ★Silicon Beach ... 60 day MBG
 5100 SuperCard 1.0 ... 125.
 ★Softstream Int'l., Inc. ... 60 day MBG
 6513 Authenticate & Mutate. ... 79.
 5440 HyperHIT 1.0 ... 125.
 ★Somak Software ... 30 day MBG
 5897 ScriptEdit 1.1 ... 49.
 ★Springboard ... 30 day MBG
 4495 Family Matters 1.0 ... 28.
 ★Symantec ... 30 day MBG
 4644 Just Enough Pascal 1.0 ... 52.
 3421 THINK Pascal 2.03 ... 103.
 3420 THINK C 4.0 ... 168.
 ★Symmetry ... 30 day MBG
 3318 HyperDA 1.2 ... 45.
 ★Timeworks ... 30 day MBG
 5905 The Hyperworks Organizer 1.0 ... 57.
 ★TML Systems ... 30 day MBG
 3548 TML Source Code Library II 1.1 ... 39.
 3549 TML Pascal II 3.0 (w/MPW 3.0) ... 109.
Trendware
 5203 Stack Cleaner ... 29.
 5202 HyperTools #1 1.02 ... 52.
 5199 HyperTools #2 1.04 ... 52.

- 5609 XCAL 1.0 ... \$77.
True BASIC, Inc.
 3587 True BASIC 2.02 ... 55.
 3583 Scientific Graphics ... 39.
 3588 3D Graphics ... 39.
 Additional Toolkits available. ... call
 ★Zedcor ... 60 day MBG
 3985 ZBASIC 5.0 ... 89.

UTILITIES

★Abbott Systems ... 30 day MBG

- 5236 CanOpener 1.1 ... 64.
 ★Affinity Microsystems ... 60 day MBG
 1014 Affinifile 1.1 ... 45.
 1016 Tempo II 1.02 ... 75.
 ★Aladdin Systems ... 30 day MBG
 6169 Shortcut 1.0.1 ... 46.
 ★American Power ... 30 day MBG
 6102 PowerChute ... 65.
 ★Berkeley Systems ... 30 day MBG
 5737 After Dark 1.1 ... 22.
 1541 Stepping Out II 2.01 ... 49.
Borland
 1510 Sidekick 2.0 ... 68.
 ★Bravo ... 30 day MBG
 5404 SPAMM 1.1 ... 48.
 ★Casady & Greene ... 60 day MBG
 2269 QuickDEX 1.4A ... 31.
 ★CE Software ... 60 day MBG
 4689 MockPackage Plus Utilities 4.4 ... 32.
 1727 CalendarMaker 3.0 ... 32.
 6278 DiskTop 4.0 ... 64.
 1729 QuickKeys 1.2 ... 64.
 ★Central Point ... 30 day MBG
 5040 Copy II Mac 7.2 ... 23.
 5041 PC Tools Deluxe Mac 1.1 ... 45.
 ★Connectix ... 30 day MBG
 6123 Virtual 2.0 (for SE/30, IICx, IIX, & IICi) ... 115.
 6122 Virtual 2.0 (for Mac II, incl. PMMU) ... 188.



Farallon Computing ... 30 day MBG
 Timbuktu Remote 1.0.1—Honorable mention—1990
 MacUser Editors' Choice Award for Best Connectivity/Networking Hardware. "Allows you to control another Mac and pass files to and from it through a modem connection". \$125.

150C

MMC
 of the Macintosh Building Association, Inc.

MacConnection™

MacConnection, 14 Mill Street, Marlow, NH 03456 1-800/334-4444 603/446-7711 FAX 603/446-7791

The experts have spoken



Broderbund Software

SimCity 1.1—1990 MacUser Editors' Choice Award for *Best Recreation Program*. "Interactive simulation that uses real-world data to create the consequences of your actions: pollution, traffic jams, urban blight, & disasters" ... \$29.

★Dantz Development ... 30 day MBG

5255 Retrospect 1.1 ... 149.

Dubl-Click Software

1824 Calculator Construction Set 2.01 ... 45.

★Electronic Arts ... 30 day MBG

1843 Disk Tools Plus 1.01 (Batteries Incl.) ... 31.

★Fifth Generation ... 60 day MBG

4287 PYRO! 3.3 (screen saver) ... 14.

3954 PowerStation 2.5 ... 34.

3955 Suitcase II 1.2.3 ... 44.

5178 FastBack II 2.0 ... 107.

5275 DiskLock 1.0 ... 107.

★HJC Software ... 30 day MBG

4803 Virex (latest version) ... 52.

5885 Virex (10 Pack) ... 329.

ICOM Simulations

4084 On Cue 1.3 ... 35.

★Insight Development ... 30 day MBG

6173 MacEnvelope 4.1 ... 79.

6171 MacPrint 1.2 ... 95.

★JAM Software ... 30 day MBG

6089 Smart Alarms Single User ... 49.

6088 Smart Alarms 1-4 Users ... 99.

6087 Smart Alarms 5-8 Users ... 149.

6086 Smart Alarms 9-15 Users ... 199.

6085 Smart Alarms 16-25 Users ... 299.

★Kent Marsh Ltd. ... 30 day MBG

5457 QuickLock 1.0 ... 56.

2591 The NightWatch 1.03 ... 86.

6134 MacSafe II ... 107.

★Kiwi Software ... 60 day MBG

6267 Kiwi Envelopes! 3.0 ... 35.

★Loop Software ... 30 day MBG

5442 PictureBook 3.2 ... 39.

★Microlytics ... 60 day MBG

2732 GOfar 2.0 ... 45.

★Microseeds Pub. ... 60 day MBG

4848 INITPicker 1.0 ... 25.

4210 Screen Gems 1.0 ... 39.

2913 Redux 1.6 ... 49.

Olduvai

4503 MultiClip 1.01 ... 50.

★ON Technology ... 1 year MBG

6385 On Location 1.0 ... 75.

★Software Innovations ... 30 day MBG

5869 HandOff 1.1 ... 32.

★Solutions Int'l. ... 60 day MBG

3448 SmartScrap & The Clipper 2.1 ... 45.

3449 SuperGlue II 2.0 ... \$61.

★SuperMac Software ... 60 day MBG

3383 SuperSpool 5.0 ... 58.

3382 SuperLaserSpool 2.0 ... 87.

3378 SuperLaserSpool 5-Pack 2.0 ... 289.

3377 DiskFit 1.5 ... 58.

3379 Network DiskFit 1.5 ... 225.

3381 Sentinel 2.0 ... 87.

★Symantec ... 30 day MBG

5176 Symantec Anti-virus for Mac 1.1 ... 68.

5724 Symantec Utilities II for Mac ... 99.

★Williams & Macias ... 30 day MBG

3779 DiskFinder ... 25.

3783 myDiskLabeler w/Color 2.9.11 ... 28.

3784 myDiskLabeler w/LaserWriter 2.9.11L ... 33.

3780 ImageWriter II Label Pack (Qty. 216) ... 15.

3781 LaserWriter Label Pack (Qty. 216) ... 18.

4976 Sticky Business 1.0.7 ... 89.

★XTree ... 30 day MBG

5177 XTreeMac 1.02 ... 52.

Broderbund Software

4314 Type! 1.0 ... \$18.

5886 Star Wars (CP) ... 24.

4099 Shufflepuck Cafe (CP) ... 24.

1421 Ancient Art of War (CP) ... 27.

4540 Ancient Art of War at Sea (CP) ... 27.

6516 The Playroom (CP) ... 27.

4229 Where/World Carmen Sandiego? (CP) ... 27.

5755 Where/Europe Carmen Sandiego? (CP) ... 29.

5233 Where/USA Carmen Sandiego? (CP) ... 29.

6384 PlayMaker Football (CP) ... 29.

1423 Jam Session 1.1 (CP) ... 29.

4966 SimCity 1.1 (CP) ... 29.

5871 SimCity Supreme (CP) ... 48.

6515 SimCity Terrain Editor (CP) ... 16.

1422 Geometry 1.2 (CP) ... 58.

4067 Calculus 1.2 (CP) ... 58.

1426 Physics 1.2 (CP) ... 58.

★Bull City Software ... 30 day MBG

5841 Moriarty's Revenge (CP) ... 32.

Bullseye

1545 Fokker Triplane 2.02 (CP) ... 24.

1544 Ferrari Grand Prix (CP) ... 32.

4074 P51 Mustang Flight Simulator (CP) ... 32.

Carina Software

5726 Voyager 1.2 ... 89.

★Casady & Greene ... 60 day MBG

2268 Crystal Quest 2.2T ... 25.

4119 Crystal Quest w/Critter Editor 2.2T ... 40.

Coda Music Systems

4367 MacDrums 1.01 (CP) ... 31.

4483 Perceive 1.0 ... 49.

5854 MusicProse 1.0 ... 169.

5604 Finale 2.0 ... 569.

Davidson & Associates

1734 Math Blaster! 1.0 (CP) ... 26.

6128 Math Blaster Mystery (CP) ... 26.

4978 Speed Reader II 1.0 (CP) ... 26.

★Electronic Arts ... 30 day MBG

1848 Patton vs Rommel ... 15.

1850 Reach for the Stars ... 26.

6297 Halls of Montezuma ... 26.

5554 Bard's Tale ... 32.

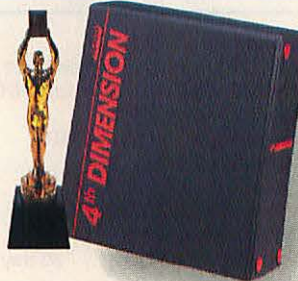
4064 Chuck Yeager Flight Simulator ... 32.

4588 Life & Death (CP) ... 32.

4945 The Hunt for Red October ... 32.

4981 Starfleet 1 ... 36.

1846 Deluxe Music Construction Set 2.5 ... 84.



Acius ... 30 day MBG

4th Dimension 2.0—1990 MacUser Editors' Choice Award for *Best Database*. "Increased power, speed and performance, makes 4th Dimension the most powerful database on the Mac" ... \$469.

LEARN & PLAY

Access Software

4655 World Class Leader Board Golf ... 26.

Accolade

1184 Hardball (CP) ... 27.

4484 Mean 18 (CP) ... 27.

4485 4th and Inches (CP) ... 27.

Activision

4475 Quarterstaff (CP) ... 29.

4486 Manhole ... 29.

5127 Manhole (CD-ROM) ... 35.

5517 Cosmic Osmo ... 41.

★Ars Nova ... 30 day MBG

1215 Practica Musica 2.2 ... 69.

★Bogas Productions ... 60 day MBG

1461 Studio Session 1.2 SE ... 45.

4255 Super Studio Session 2.0 ... 65.

6135 Super Studio Bundle (w/5 below) ... 99.

1459 Heavy Metal Rock ... 13.

1460 String Quartet ... 13.

1458 Country Disk ... 13.

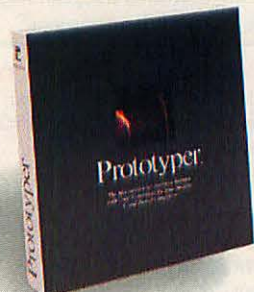
4832 Sound Effects ... 13.

5719 Brass Disk ... 13.

Bright Star Technology

3961 Talking Tiles 1.0 ... 27.

1402 Alphabet Blocks 1.0 ... 30.



SmethersBarnes ... 30 day MBG

Prototyper 2.1—Honorable mention—1990 MacUser Editors' Choice Award for *Best Programming Tool*. "Clearly shows direction CASE interface tools should be taking" 3.0 now supports custom controls & more flexible code generation \$185.

and they aren't jokin'.



Abacus Concepts ... 30 day MBG
SuperANOVA 1.1—1990 MacUser Editors' Choice Award for Best Data Acquisition/Analysis Product. Analyzes virtually any general linear model used to perform ANOVA, ANCOVA, MANOVA, MANCOVA, & regression on data \$465.

- ★**First Byte ... 30 day MBG**
- 5294 Puzzle Storybook 1.0 (ages 3-8) ... 27.
 - 5293 Dinosaur Discovery Kit 1.0 (ages 3-8) ... 27.
 - 3941 SmoothTalker 2.1 ... 32.
 - 3936 KidTalk 2.0 (ages 5-15) ... 32.
 - 3935 Speller Bee 2.0 (ages 5-12) ... 32.

- ★**Great Wave ... 30 day MBG**
- 2277 TimeMasters 1.0 (ages 4 +) ... 22.
 - 2276 KidsTime 1.2 (ages 3-8) ... 26.
 - 5642 KidsMath 1.1 (ages 3-8) ... 26.
 - 4334 NumberMaze 1.1 (ages 5-12) ... 26.
 - 2270 American Discovery 2.3 (ages 9 +) ... 26.
 - 2273 ConcertWare+ 4.0 ... 38.
 - 2271 ConcertWare+ MIDI 5.0 ... 99.

- Infocom**
- 5814 Journey ... 29.
 - 5816 Shogun ... 35.

- Inline Design**
- 5870 Bomber (includes headphones) ... 26.

- ★**Learning Company ... 30 day MBG**
- 2670 Reader Rabbit 2.1 (CP) (ages 4-7) ... 31.
 - 5453 Talking Math Rabbit 1.0 (ages 4-7) ... 31.

- MicroProse**
- 4697 Pirates! (CP) ... 35.

- ★**Microsoft ... 30 day MBG**
- 2868 Flight Simulator (CP) ... 33.

- Miles Computing**
- 5253 The Puzzle Gallery ... 26.
 - 2765 Fool's Errand ... 32.
 - 2767 Harrier Strike Mission II (CP) ... 32.

- Mindscape**
- 4083 Balance of Power 1990 (CP) ... 29.
 - 3987 Colony (CP) ... 29.
 - 4596 Deja Vu II (CP) ... 29.
 - 2743 Crossword Magic (CP) ... 29.
 - 2749 Shadowgate (CP) ... 29.
 - 5252 Gauntlet (CP) ... 29.
 - 2751 Uninvited (CP) ... 29.

- ★**Paragon Concepts ... 30 day MBG**
- 6094 MacTag 2.04 ... 42.

★Penton Overseas ... 30 day MBG

- 5864 VocabuLearn/ce French (level 1) ... \$29.
- 5887 VocabuLearn/ce French (level 2) ... 29.
- 5865 VocabuLearn/ce Italian (level 1) ... 29.
- 5889 VocabuLearn/ce Italian (level 2) ... 29.
- 5867 VocabuLearn/ce Spanish (level 1) ... 29.
- 5891 VocabuLearn/ce Spanish (level 2) ... 29.
- 5868 VocabuLearn/ce German (level 1) ... 29.
- 5888 VocabuLearn/ce German (level 2) ... 29.
- 5866 VocabuLearn/ce Japanese (level 1) ... 35.
- 5890 VocabuLearn/ce Japanese (level 2) ... 35.

★Personal Training Sys. ... 60 day MBG

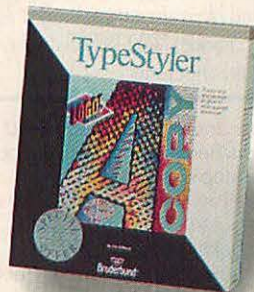
- Personal Training for Excel*
- 5573 XL1 Beginning Spreadsheets ... 36.
 - 5574 XL2 Intermediate Spreadsheets ... 36.
 - 5575 XL3 Advanced Spreadsheets ... 36.
 - 5576 XL4 Creating Business Graphics ... 36.
 - 6021 XL5 Building Databases ... 36.
 - 6020 XL6 Beginning Macros ... 36.
 - 6367 XL7 Advanced Macros ... 36.

- Personal Training for Macintosh*
- 5263 B1 The Basics (for 2 floppy drives) ... 36.
 - 5264 B2 The Basics (for Plus or SE w/HD) ... 36.
 - 5265 B3 The Basics (for Mac II w/HD) ... 36.
 - 5266 B4 Beyond the Basics ... 36.

- Personal Training for Word*
- 4947 W1 Beginning Level ... 36.
 - 4854 W2 Intermediate Level ... 36.
 - 5098 W3 Advanced Level ... 36.
 - 5418 W4 Additional Features ... 36.

- Personal Training for Persuasion*
- 5269 LP1 Beginning Persuasion ... 36.
 - 5270 LP2 Intermediate Persuasion ... 36.
 - 5271 LP3 Creating AutoTemplates ... 36.
 - 5272 LP4 Creating Artwork ... 36.

- Personal Training for HyperCard*
- 5194 H1 Using HyperCard ... 36.
 - 5195 H2 Creating Cards & Stacks ... 36.
 - 5267 H3 Basic Scripting ... 36.
 - 5268 H4 Advanced Scripting ... 36.



Broderbund Software
TypeStyler 1.0—Honorable mention—1990 MacUser Editors' Choice Award for Best Typographic Product. "Let's you create sophisticated special effects with thousands of third-party PostScript fonts" \$119.

Personal Training for PageMaker

- 4852 P1 Beginning PageMaker ... \$36.
- 4853 P2 Intermediate PageMaker ... 36.
- 5096 P3 Tips & Techniques ... 36.
- 5097 P4 Advanced Features ... 36.

Personal Training for Works

- 5196 M1 Database & Form Letters ... 36.
- 5197 M2 Advanced Databases ... 36.
- 5273 M3 Spreadsheets ... 36.
- 5274 M4 Word Processing ... 36.



Abbott Systems ... 30 day MBG
CanOpener 1.1—1990 MacUser Editors' Choice Award for Best File-Management Utility. "Opens any type of Paint, PICT, EPSF, or text file without conversion. Also searches for text strings—even within a graphic" \$64.

Personal Training for Illustrator 88

- 5259 A1 Beginning Illustrator ... 36.
- 5260 A2 Intermediate Illustrator ... 36.
- 5261 A3 Creating Special Effects ... 36.
- 5262 A4 Precision Drawing Techniques ... 36.

Personal Training for FileMaker

- 5278 FM1 Beginning FileMaker ... 36.
- 5279 FM2 Intermediate FileMaker ... 36.
- 5280 FM3 Advanced FileMaker ... 36.
- 5281 FM4 Tips & Techniques ... 36.

Personal Training for FreeHand

- 6353 FH1 Beginning Level ... 36.

Postcraft

- 6466 Citadel ... 30.

Premier Technology

- 5773 Strategic Conquest Plus 2.0 ... 34.
- 5774 NetTrek-The Real Version ... 34.

Sierra On-Line

- 3397 Leisure Suit Larry (CP) ... 23.
- 5694 Manhunter: San Francisco (CP) ... 29.
- 3394 King's Quest (CP) ... 29.
- 3395 King's Quest II (CP) ... 29.
- 3396 King's Quest III (CP) ... 29.
- 3398 Police Quest (CP) ... 29.
- 3399 Space Quest (CP) ... 29.
- 3400 Space Quest II (CP) ... 29.

★Silicon Beach ... 60 day MBG

- 3502 Beyond Dark Castle ... 24.
- 3501 Apache Strike ... 24.
- 3503 Dark Castle ... 24.

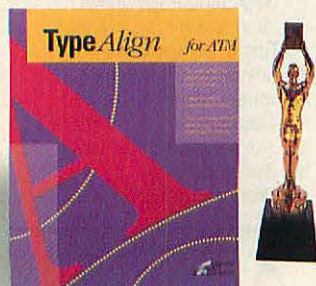
150C

MMC
 of the Macintosh Connection, Inc.

MacConnection™

MacConnection, 14 Mill Street, Marlow, NH 03456 1-800/334-4444 603/446-7711 FAX 603/446-7791

So place your order



Emerald City ... 30 day MBG
TypeAlign for ATM 1.0—1990 MacUser Editors' Choice Award for Best Typographic Product. "If you have ATM and want to do typographic special effects, TypeAlign is a must".... \$60.

★Softstream Int'l., Inc. ... 60 day MBG

4071	Mac•Man.....	23.
4072	The Solitaire DA.....	23.
4995	Cribbage Tutor.....	26.
6259	22nd Street Whist Tutor.....	32.
6258	MacRummy Tutor.....	32.
4073	Colour Billiards.....	38.

★Software Toolworks ... 30 day MBG

1842	Chessmaster 2000 (CP).....	28.
4619	Mavis Beacon Typing 1.2B (CP).....	32.
6111	Cribbage King-Gin King.....	39.

★Spectrum Holobyte ... 30 day MBG

4175	Solitaire Royale (for Mac SE).....	19.
4001	Solitaire Royale (for Mac II).....	19.
3464	Tetris.....	19.
4472	Tetris (color version).....	22.
3462	PT-109.....	26.
3460	GATO.....	26.
3459	Falcon 2.0.....	30.

★Spinnaker ... 30 day MBG

2328	Sargon IV (CP).....	29.
2329	SAT Score Improvement 1.0 (CP).....	57.

★Springboard ... 30 day MBG

4493	Atlas Explorer (CP).....	28.
4988	Hidden Agenda.....	36.

★SubLogic ... 60 day MBG

4698	Jet (CP).....	32.
	Europe, Japan, and Hawaii scenery disks also available.....	each 19.

★Think Educational ... 60 day MBG

3615	MacEdge II 1.0 (CP) (ages 6-12).....	27.
------	--------------------------------------	-----

★True BASIC, Inc.

3571	Algebra (with workbook).....	45.
3580	Pre-Calculus (with workbook).....	45.
3575	Calculus (with workbook).....	45.
6110	Algebraic Proposer 2.0.....	45.

★Unicorn ... 30 day MBG

3751	Animal Kingdom (CP) (ages 6-12).....	27.
3756	Math Wizard (CP) (ages 5-10).....	27.
3755	MacRobots (CP) (ages up to 6).....	27.
3754	Read-A-Rama (CP) (ages 5-8).....	32.

★Wayzata Tech. ... 60 day MBG

6369	The World Factbook 1989 (CD-ROM).....	69.
------	---------------------------------------	-----

★XOR ... 30 day MBG

6152	TaskMaker (CP).....	27.
4517	Road Racer (CP).....	38.
6041	MacGolf (CP).....	34.
4320	MacGolf Classic (CP).....	53.

NETWORKS & COMMUNICATIONS

★Abaton ... 30 day MBG

4589	InterFAX 12/48 Modem.....	\$265.
6266	InterFAX 24/96 Modem.....	419.

★CE Software ... 60 day MBG

5174	QuickMail 2.0 (5 user Pak).....	169.
5173	QuickMail 2.0 (10 user Pak).....	249.

★CompuServe ... 60 day MBG

1676	CompuServe Information Service.....	24.
1673	CompuServe Navigator 2.1.....	39.
1674	Standard Service/Navigator Bundle.....	59.

Connect, Inc.

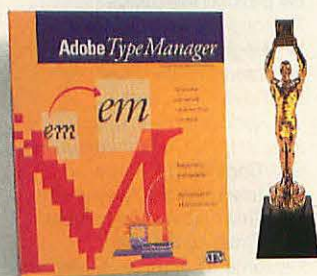
5834	Connect 1.5 for the Macintosh.....	63.
------	------------------------------------	-----

★DataViz ... 60 day MBG

1823	MacLink Plus/PC 4.1.....	125.
4842	MacLink Plus/Translators 4.1.....	99.

★Dove Computer ... 60 day MBG

4939	FastNet III.....	375.
4938	FastNet SE.....	375.
5624	FastNet SE/30.....	375.
4937	FastNet SCSI.....	749.



Adobe Systems

Adobe Type Manager—1990 MacUser Editors' Choice Award for Most Significant Software Product and Honorable mention for Best Typographic Product. "Provides WYSIWYG display of Adobe PostScript fonts"..... \$56.

★Dow Jones ... 30 day MBG

5295	News/Retrieval Membership Package.....	24.
1785	Desktop Express 1.03.....	95.

★Farallon Computing ... 30 day MBG

5707	Timbuktu 3.0.....	95.
4866	Timbuktu Remote 1.0.1.....	125.
6371	Timbuktu/Remote Access Pack.....	859.
4867	Timbuktu 30-Pack 3.0.....	1295.
2201	TrafficWatch 1.08.....	125.
2202	PhoneNET to LocalTalk Adapter.....	8.
5664	PhoneNET StarConnector.....	20.
6273	PhoneNET StarConnector 10-Pack.....	139.
4869	PhoneNET Connector 10-Pack.....	198.
2204	PhoneNET PLUS (DB-9).....	32.
2203	PhoneNET PLUS (DIN-8).....	32.
5251	PhoneNET CheckNET.....	64.
4868	PhoneNET Repeater.....	315.
2206	PhoneNET StarController.....	825.
2205	Star Wiring Kit (Punchdown).....	64.
5455	Star Wiring Kit (Harmonica).....	64.
5893	Portable Pack (incl. two copies each of Timbuktu & Timbuktu Remote, two StarConnectors, and accessories).....	375.

★Freesoft ... 60 day MBG

6115	White Knight 11.....	85.
------	----------------------	-----

Hayes

2300	Smartcom II 3.1A.....	\$85.
2307	Smartmodem 2400.....	349.
5991	V9600 Baud Modem.....	759.

Insignia Solutions

4089	SoftPC 1.3.....	245.
------	-----------------	------

Intel Corporation

5119	2400EX Modem.....	179.
6265	2400EX with MicroPhone 1.5.....	245.

★Microsoft ... 30 day MBG

5858	Microsoft Mail 2.0 Workstation.....	84.
5856	Microsoft Mail 2.0 Server.....	249.
5857	Microsoft Mail 2.0 (20 Pack).....	969.

★Nuvotech ... 60 day MBG

3000	TurboNet ST (DIN-8).....	30.
5277	TurboBridge.....	319.
6272	NuvoLink SC.....	319.
6261	TurboStar.....	1359.

★Practical Peripherals ... 30 day MBG

3102	2400 Baud External Modem.....	179.
5285	PM 2400SA MNP Modem.....	209.
3089	Mac Communications Pack 1.5.....	225.

★Shiva ... 30 day MBG

3444	NetSerial X232.....	279.
4347	NetBridge.....	339.
4942	TeleBridge.....	339.
3443	NetModem V2400.....	439.
6519	EtherGate.....	1629.

★Software Ventures ... 30 day MBG

3455	MicroPhone II 3.0.....	215.
------	------------------------	------

★Solutions Int'l. ... 60 day MBG

4308	BackFAX (reqs. Apple FAX modem).....	124.
------	--------------------------------------	------

★Synergy ... 30 day MBG

3130	VersaTerm 4.1.1.....	88.
3131	VersaTerm-PRO 3.1.1.....	174.

★TOPS ... 30 day MBG

4598	TOPS FlashBox.....	119.
3725	TOPS Repeater.....	119.
3720	TOPS Flashcard.....	155.
6264	Network Bundle for Mac 3.0.....	189.
6377	InBox/Mac Administrator (20 user).....	215.

★Traveling Software ... 60 day MBG

3729	LapLink Mac III Connectivity Pac.....	114.
------	---------------------------------------	------

INPUT/OUTPUT

★American Power ... 30 day MBG

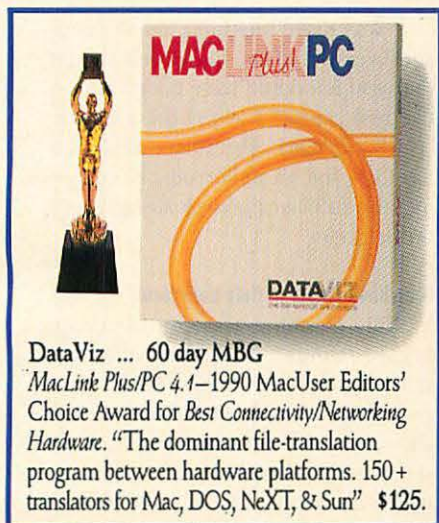
5895	110SE UPS.....	209.
------	----------------	------



Microsoft ... 30 day MBG

Word 4.0—1990 MacUser Editors' Choice Award for Best Word Processor. "Added some innovative features, such as an integrated table space maker, completely customizable menus, and dynamic data links"..... \$249.

soon as you're ready.



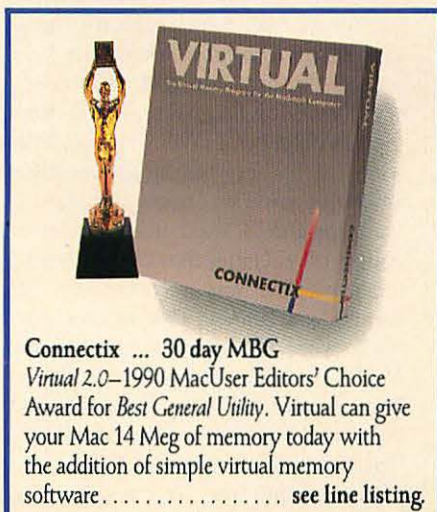
DataViz ... 60 day MBG
MacLink Plus/PC 4.1—1990 MacUser Editors' Choice Award for Best Connectivity/Networking Hardware. "The dominant file-translation program between hardware platforms. 150+ translators for Mac, DOS, NeXT, & Sun" \$125.

- Caere**
- 4476 OmniPage 2.1 539.
- ★ **CoStar ... 30 day MBG**
- 6067 LabelWriter Labels 11.
- 6090 LabelWriter 185.
- ★ **Cutting Edge ... 30 day MBG**
- 3988 CE 105ADB Keyboard w/QuickKeys . 135.
- ★ **Datadesk ... 30 day MBG**
- 1818 HyperDialer 29.
- 1819 MAC-101 Keyboard (beige) 139.
- 1820 MAC-101 Keyboard (platinum) 139.
- 1821 MAC-101 Keyboard (ADB) 139.
- ★ **GDT Softworks ... 30 day MBG**
- 6256 PrintLink Collection 59.
- 6151 JetLink Express 1.02 89.
- 6255 Expressive Fonts 119.
- 6257 JetLink/Expressive Fonts Bundle . 159.
- Hewlett Packard**
- 6514 HP DeskWriter Printer call
- ★ **Kensington ... 30 day MBG**
- 2576 Turbo Mouse for Mac Plus 3.0 . . . 109.
- 2547 Turbo Mouse ADB 3.0 . . . 109.
- Koala**
- 2593 MacVision 2.1 219.
- ★ **Kraft Systems ... 60 day MBG**
- 2600 3-Button QuickStick 39.
- 4082 3-Button QuickStick ADB 49.
- 6099 ADB Trackball (with foot pedal) . . . 79.
- ★ **Logitech ... 30 day MBG**
- 5082 ScanMan Mac 319.
- ★ **LYNX Computer ... 30 day MBG**
- 1211 LYNX Trackball special 49.
- 1212 LYNX Trackball ADB special 49.
- ★ **Microseeds Pub. ... 60 day MBG**
- 4843 WristMac 1.0 145.
- 5018 WristMac Executive 1.0 189.
- ★ **Mobius Technologies ... 60 day MBG**
- 6126 Cordless Mouse 99.
- ★ **Mouse Systems ... 30 day MBG**
- 2808 A+ Mouse 59.
- 2809 A+ Mouse ADB 79.
- ★ **Nutmeg Systems ... 30 day MBG**
- 4096 19" Monitor for Mac SE 1195.
- 5680 19" Monitor for Mac SE/30 1195.
- 4097 19" Monitor for Mac II 1195.
- 6240 30/2 Interface (SE/30 video board) 499.
- Oldival Software**
- 5138 Read-It! OCR Personal 2.1 125.

- 3034 Read-It! OCR 2.1 \$245.
- ★ **Orange Micro ... 30 day MBG**
- 4488 Grappler Spooler 47.
- 3036 Grappler C/Mac/GS 2.0 78.
- 4487 Grappler LS 1.0 103.
- 6229 Grappler LX 129.
- Summagraphics**
- 4298 BitPad Plus ADB 319.
- TheComplete PC**
- 6104 TheComplete Half-Page
 Scanner/400 315.
- 6103 TheComplete Page Scanner 759.
- ★ **Thunderware ... 30 day MBG**
- 3648 ThunderScan 5.0 with PowerPort . 185.
- 4994 LightningScan 369.
- 3645 Mac II Power Accessory 45.


MEMORY & DRIVES

- 1 Meg SIMMs**
- 1107 Low profile 80 nanoseconds SIMMs at
 the best prices. 2 year warranty. . . . 89.
- ★ **Cutting Edge ... 30 day MBG**
- 3989 800k External Disk Drive (platinum) 149.
- 5133 20 Meg Hard Drive 359.
- 3990 30+ Meg Hard Drive 429.
- 3991 45+ Meg Hard Drive 489.
- 5275 65+ Meg Hard Drive 589.
- 5276 80+ Meg Hard Drive 649.
- 5456 44 Meg Removable Drive 799.
- 5736 44 Meg Removable Cartridge . . . 109.
- ★ **Dove Computer ... 60 day MBG**
- 1802 Dove Tool Kit 15.
- 1801 SCSI Interface/Port 109.
- 5879 MaraThon Serial/Parallel 195.
- 1807 MacSnap 524E 185.
- 1809 MacSnap 524S 239.
- 1811 MacSnap 548E 419.
- 1812 MacSnap 548S 479.
- 1804 MacSnap 2S 189.
- 1805 MacSnap 4S 369.
- ACCELERATOR BOARDS**
- 1793 MaraThon 020 MSE1 419.
- 1794 MaraThon 020 MSE2 (1 Meg) . . . 689.
- 1795 MaraThon 020 MSE3 (math chip) . . 579.
- 1796 MaraThon 020 MSE4 (1 Meg/chip) . . 869.
- 5192 MaraThon 020 MSE5 (4 Meg) . . . 799.
- 5193 MaraThon 020 MSE6 (4 Meg/chip) . 979.



Connectix ... 30 day MBG
Virtual 2.0—1990 MacUser Editors' Choice Award for Best General Utility. Virtual can give your Mac 14 Meg of memory today with the addition of simple virtual memory software. see line listing

- 4663 MaraThon 030 Accelerator 32 MHz \$869.
- 5878 MaraThon 030x Accelerator 969.
- 5880 MaraThon 030 SE/30 Accelerator . . 969.
- 5623 MaraThon Racer 159.
- ACCELERATORS (020) W/ETHERNET**
- 5391 FastNet LAN 1 949.
- 5390 FastNet LAN 2 (1 Meg) 1349.
- 5389 FastNet LAN 3 (math chip) . . . 1219.
- 5388 FastNet LAN 4 (1 Meg/chip) . . . 1549.
- 5387 FastNet LAN 5 (4 Meg) 1439.
- 5386 FastNet LAN 6 (4 Meg/chip) . . . 1679.



Informix
WingZ 1.1—1990 MacUser Editors' Choice Award for Best Spreadsheet. "WingZ is not just a powerful spreadsheet, it's a sophisticated development environment for customized applications." 3-D graphics and tools . . \$249.

- ★ **Kennect Tech. ... 30 day MBG**
- 5631 Rapport 199.
- 5632 Drive 2.4 (includes FastBack II) . . . 329.
- ★ **SuperMac Tech. ... 30 day MBG**
SuperMac drives include SuperSpool, SuperLaserSpool, Diskfit and Manager
- 5452 Dataframe 20 529.
- 5447 Dataframe XP 30 629.
- 5448 Dataframe XP 60 859.
- 5449 Dataframe XP 100 1149.

STORAGE MEDIA

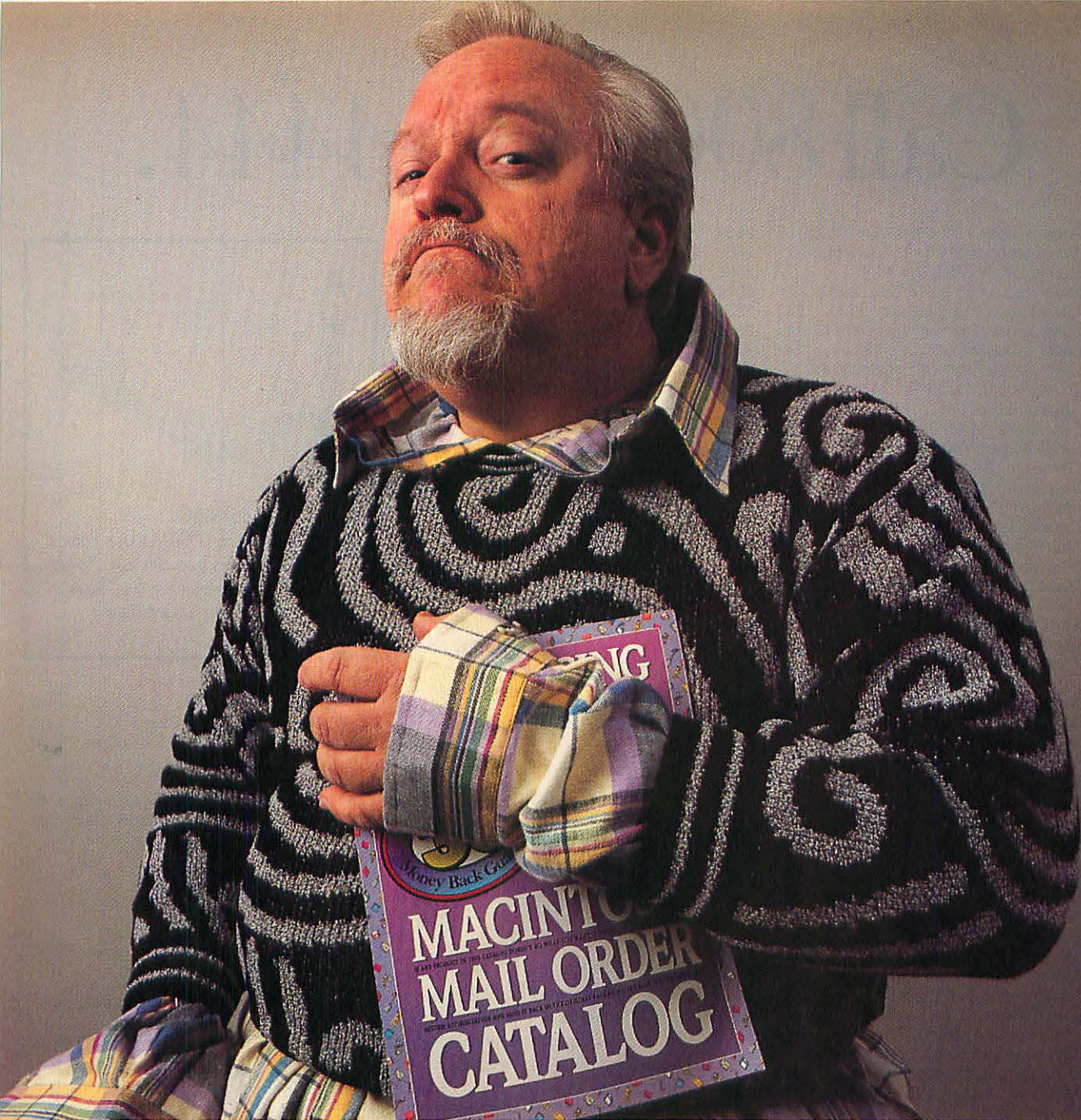
- ★ **Verbatim ... 60 day MBG**
- 3772 3 1/2" DS/DD Disks (10) 15.
- 3773 3 1/2" HD Disks 1.44 Meg (10) . . . 29.
- ★ **Sony ... 60 day MBG**
- 3297 3 1/2" DS/DD Disks (10) 13.
- 6148 3 1/2" DS/DD Disks 3 Pak (30) . . . 30.
- 3298 3 1/2" HD Disks 1.44 Meg (10) . . . 24.
- 6375 3 1/2" HD Disks 3 Pak (30) 60.
- ★ **MAXELL ... 60 day MBG**
- 2792 3 1/2" DS/DD Disks (10) 14.
- 2793 3 1/2" HD Disks 1.44 Meg (10) . . . 27.
- ★ **3M ... 60 day MBG**
- 3943 DC2000 Tape Cartridge 20.

ACCESSORIES

- Apple Computer**
- 1113 Black ImageWriter Ribbon 10.
- 1114 LaserWriter Plus Toner Cartridge . . 109.
- 1115 LaserWriter II Toner Cartridge . . . 115.
- ★ **Avery ... 60 day MBG**
- 4864 Disk Labels 3 1/2" (Qty. 250) . . . 13.
- 5392 Disk Labels—Laser 3 1/2" (Qty. 630) . 29.
- 5403 Address Labels 17 1/16" x 4" (Qty. 1000) . . 9.

1-800-343-4424
TYPE Xpress
World Class Postscript® Typefaces and Graphics
A marketing unit of ZIPATONE, Inc.
150 Fencil Lane, Hillside, Illinois 60162

Steven Levy is a Macworld columnist and the author of The Unicorn's Secret: Murder in the Age of Aquarius (NAL, 1989).



"I was very skeptical of mail order."

Dear MacConnection,

After some unfortunate experiences purchasing clothes through mail order, I was *very* skeptical of mail order shopping for my Mac. Until a friend insisted that I give MacConnection a try. Your salespeople have been very knowledgeable and helpful in selecting the proper

program for the job, your overnight delivery is incredibly fast (even during Christmas rush), and your prices are as competitive as anyone's.

Now I doubt if I'll ever buy my computer-related material any other way!

Joe Van Riper
Charlotte, NC

MacConnectionTM 1-800/334-4444

MacConnection, 14 Mill Street, Marlow, NH 03456 1-800/334-4444 603/446-7711 FAX 603/446-7791

© Copyright 1990 PC Connection, Inc. MacConnection is a division and trademark of PC Connection, Inc., Marlow, NH.

Just for the record, all the ads in this series feature photographs of real live MacConnection customers and the real live letters they wrote us. Really!

Call 800/334-4444.

4865	Address Labels 3 1/2" x 1 5/16" (Qty. 3750)	\$15.
4811	Transparencies 8 1/2" x 11" (Qty. 50)	22.
4813	Round Labels 3 1/3" (Qty. 150)	7.
4812	Laser Labels 1 1/2" x 1 3/4" (Qty. 2000)	7.
4807	Laser Labels 1" x 2 5/8" (Qty. 3000)	24.
4808	Laser Labels 1 1/2" x 4" (Qty. 1400)	24.
4809	Laser Labels 2" x 4" (Qty. 1000)	24.
4810	Laser Labels 8 1/2" x 11" (Qty. 100)	24.

★Basic Needs ... 60 day MBG

5635	Keyboard Flip	6.
5633	LaserWriter Printer Stand	28.
5634	Large Screen Monitor Stand	38.

★Computer Coverup ... 60 day MBG

1722	ImageWriter LQ Cover	8.
1723	ImageWriter II Cover	8.
4657	LaserWriter II Cover	10.
1720	Mac Plus Cover	10.
1724	Mac SE Cover	10.
1725	Mac SE Ext. Keyboard Cover Set	10.

★CoStar ... 30 day MBG

6091	The Organizer	199.
------	---------------	------

★Goldstein & Blair ... 30 day MBG

2267	The Macintosh Bible (2nd Edition)	19.
------	-----------------------------------	-----

★I/O Design ... 30 day MBG

2379	MacLuggage Imageware II	49.
2376	MacLuggage Macinware Plus	64.
2381	MacLuggage Macinware SE	75.
6129	The Ultimate SE Carrying Case	79.

★Kensington ... 30 day MBG

MacConnection carries the entire line of Kensington's accessories. A partial listing follows.

2577	Mouseway Pad	7.
2563	Mouse Pocket ADB	8.
2569	Mac Plus/SE w/System Saver Cover	9.
2558	ImageWriter II Dust Cover	9.
2589	Universal Printer Stand	15.
4970	Modem/FAX Protector 10	15.
4971	Modem/FAX Protector 20	25.
4126	LaserWriter II Dust Cover	17.
2580	Mac II Stand	20.
2545	Universal Copy Stand	22.
2573	Tilt/Swivel (platinum)	22.
2578	Extra Long ADB Keyboard Cable	25.
2579	Mac II Monitor Cable Extension Kit	33.
4972	Power Tree 10	19.
4973	Power Tree 20	27.
4974	Power Tree 50	54.


2559	Apple Security Kit	\$33.
2568	MacAccessories SuperBase	33.
2585	Printer Muffler 80	43.
4070	System Saver SE	52.
2566	System Saver Mac (platinum)	63.
2567	System Saver Mac (beige)	63.
2546	A-B Box (DIN-8)	63.
2556	MacAccessories Anti-Glare Filter SE	33.
5064	Apple Color Monitor Polarizing Filter	63.
5065	Full Page Display Polarizing Filter	63.
5066	Two Page Display Polarizing Filter	135.
4941	Mac II Monitor Stand	64.
4643	Mac II Stand and Cable Kit	64.
2561	MasterPiece Mac II	105.
5894	PowerBacker 360	269.
5577	PowerBacker 450	339.
5578	PowerBacker 520	399.
5230	PowerBacker 800	749.
5228	PowerBacker 1200	949.

★MacConnection ... 60 day MBG

4623	Solid Oak Disk Case (holds 90 disks)	32.
------	--------------------------------------	-----

★Mobius Technologies ... 60 day MBG

4470	Fanny Mac QT	55.
------	--------------	-----



Microlytics ... 60 day MBG
Gofer 2.0—Honorable mention—1990 MacUser Editors' Choice Award for Best Word Processing Utility. "GOfer 2.0 can quickly browse through the text in hundreds of pages in hundreds of documents" ... \$45.

★Moustrak ... 60 day MBG

Available in blue or gray.

2694	Moustrak Pad (standard 7" x 9")	8.
2692	Moustrak Pad (large 9" x 11")	9.
2693	Moustrak Pad L/F (9" x 11")	10.

Ribbons

Available in black, blue, brown, yellow, green, orange, purple, red, silver & gold.

3255	ImageWriter II Ribbon	4.
3261	ImageWriter II 4-Color Ribbon	9.
3270	ImageWriter II Rainbow Six Pack	20.
3260	ImageWriter LQ Black Ribbon	17.
4011	ImageWriter LQ 4-Color Ribbon	20.

★Sopris Softworks ... 60 day MBG

4171	Mac SE Std. Keyboard Cover (navy)	15.
4019	Mac SE & Ext. Keyboard Cover (navy)	15.
4017	ImageWriter II Cover (navy)	11.
4018	LaserWriter II Series Cover (navy)	17.
4012	High Trek ImageWriter II Carry Case	49.
4013	High Trek Mac Plus Carry Case	59.
4014	High Trek Mac SE & Ext. Kybd. Case	69.
5877	Mac II Monitor Carry Case	59.
5839	Mac IIcx CPU & Kybd. Carry Case	69.
4861	SE Protection Pak (std. keyboard)	65.
4862	SE Protection Pak (ext. keyboard)	75.



Abaton ... 30 day MBG

InterFAX 24/96 Modem—1990 MacUser Editors' Choice Award for Best Communications Product. "Its Fax software is easy to use & produces excellent output: it can also send & receive in the background" ... \$419.

★Targus ... 60 day MBG

3618	ImageWriter II Carry Case	45.
3617	Mac Plus/SE Carry Case	55.
4015	Mac SE & Ext. Kybd. Carry Case	69.
6116	Mac IIcx Carry Case	85.

★Tripp Lite ... 30 day MBG

6199	Isobar 4 (surge suppressor, 4 outlets)	49.
6200	Isobar 6 (surge suppressor, 6 outlets)	59.


OUR POLICY

- We accept VISA and MASTERCARD.
- No surcharge added for credit card orders.
- Your card is not charged until we ship.
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order.
- No sales tax.
- All U.S. shipments insured; no additional charge.
- APO/FPO orders shipped First Class Mail.
- International orders U.S. \$250 minimum.
- Upon receipt and approval, personal and company checks now clear the same day for immediate shipment of your order.
- Corporate P.O.s accepted subject to credit approval.
- COD max. \$1000. Cash or certified check.
- 120 day limited warranty on all products. Defective software replaced immediately. Defective hardware repaired or replaced at our discretion. All items subject to availability. Prices and promotions subject to change without notice.
- To order, call us anytime Monday through Friday 9:00 AM to 1:00 AM EST, or Saturday 9:00 AM to 5:30 PM EST. You can call our business offices at 603/446-7711 Monday through Friday 9:00 AM to 5:30 PM EST.

SHIPPING

Continental US: Barring massive computer failures and other natural or unnatural catastrophes, all credit card orders phoned into MacConnection weekdays by 8 PM EST will ship Airborne Express the same night for delivery the next business day, except for those within UPS Ground Zone 1 (which is also an overnight service). Saturday delivery available to many areas upon request. Some areas require an additional day delivery. The total freight charge on any order placed with MacConnection is only \$3.

Hawaii, Alaska and Outside Continental US: Call 603/446-7711 for information.



Software Ventures ... 30 day MBG
MicroPhone II 3.0—Honorable mention—1990 MacUser Editors' Choice Award for Best Communications Product. "Support for ZMODEM protocol. Let's you create a complete custom front end" ... \$215.

Macintosh Training That Works

"I have been using FileMaker for about a year now and decided to get the MacAcademy tape to see how the program was presented, the content, and to see if other tapes would be useful. After looking at the tape I promptly ordered three more! Needless to say I was pleased, as the tapes are professionally done and most useful. You and your company do a fine job." Mr. James H. Patterson, M.D.

DAYTONA BEACH, FL- "There's got to be a faster, easier, and less expensive way!" This statement sums up the frustration that Randy Smith felt three years ago as he tried to find training for the Macintosh computer.

That frustration led to the creation of MacAcademy, now the nation's leading Macintosh training program, and the recent introduction of the country's **first complete Macintosh Video Training Series**. MacAcademy teaches over 18,000 people each year in 65 major metro areas. The program is proud of the fact that both beginning and advanced Macintosh users, from over 12,000 companies large and small, have found MacAcademy's live workshops to be an excellent, low priced training solution.

In order to offer additional training, MacAcademy's next step was to put each of their dynamic training workshops on video. (And to offer an additional dozen training videos for programs not even offered at MacAcademy.)

Now you may choose from over 26 different, 2-hour, VHS MacAcademy Videos for only \$49 each. A complete list of programs can be found in the coupon below.

MacAcademy Video Training tapes offer tremendous advantages for today's Macintosh user. When using the videos you actually *see* the steps take place on a Macintosh screen. A small inset will show you the instructor and the mouse or keyboard. The instructors featured on the videos are MacAcademy's top rated teachers who have trained employees of all but two of the USA's Fortune 500 companies and who have each received a consistent rating of *excellent*.

Training videos offer the valuable advantage of building a learning and reference library. If you ever want to brush up on a technique, simply go back to the video and review the technique demonstrated. If you hire a new employee, simply have them review the video for the program they'll be using. Videos offer the unique flexibility of teaching both individuals or hundreds of people at one sitting.

In addition to a super \$49 price, the videos also carry a 30-day satisfaction guarantee. If you're not totally satisfied, simply send the tape back for a full refund.

MacAcademy will continue offering the nation's highest rated live training courses in major cities. But in addition, you may also build your Macintosh training library.

Videos may be ordered by phone with credit card information, or by mail with check, credit card, or purchase order. You may also send orders by FAX. Your business is appreciated and your satisfaction is guaranteed.



The MacAcademy Video Library features over 26 Macintosh training tapes. Each two hour VHS video tape captures the unique and effective teaching and learning techniques of MacAcademy's top instructors.

MacAcademy Video Training Series

477 S. Nova Rd. Ormond Beach, FL 32174 Dept. MW490
904-677-1918 FAX 904-677-6717

Videos Only \$49 Each (Check desired tapes)

- | | |
|--|--|
| <input type="checkbox"/> Beginning Mac (#1) | <input type="checkbox"/> Advanced FileMaker II |
| <input type="checkbox"/> Beginning Mac (#2) | <input type="checkbox"/> Beginning Word 4.0 |
| <input type="checkbox"/> Advanced Mac | <input type="checkbox"/> Advanced Word 4.0 |
| <input type="checkbox"/> Beginning Adobe Ill. | <input type="checkbox"/> Beginning QuarkXPress |
| <input type="checkbox"/> Intermediate Adobe Ill. | <input type="checkbox"/> Intermediate QuarkXPress |
| <input type="checkbox"/> Super Paint | <input type="checkbox"/> Advanced QuarkXPress |
| <input type="checkbox"/> Beginning PageMaker | <input type="checkbox"/> Dollars and Sense |
| <input type="checkbox"/> Intermediate PageMaker | <input type="checkbox"/> Works: Integration |
| <input type="checkbox"/> Advanced PageMaker | <input type="checkbox"/> Works: Word Processing |
| <input type="checkbox"/> Beginning Excel 2.2 | <input type="checkbox"/> Works: Data Base |
| <input type="checkbox"/> Intermediate Excel 2.2 | <input type="checkbox"/> Works: Spread Sheet |
| <input type="checkbox"/> Advanced Excel 2.2 | <input type="checkbox"/> HyperCard Basics |
| <input type="checkbox"/> Beginning FileMaker II | <input type="checkbox"/> Mac Networking Techniques |

Number of Videos: _____ Number x \$49.00: \$ _____

Add \$1 Per Video Shipping: \$ _____

NAME _____ Florida Residents Add 6%: \$ _____

COMPANY _____ Total: \$ _____

STREET (no P.O. Boxes please) _____

CITY _____ STATE _____ ZIP _____

TELEPHONE _____

CREDIT CARD NO. _____

SIGNATURE _____ CARD EXP. DATE _____

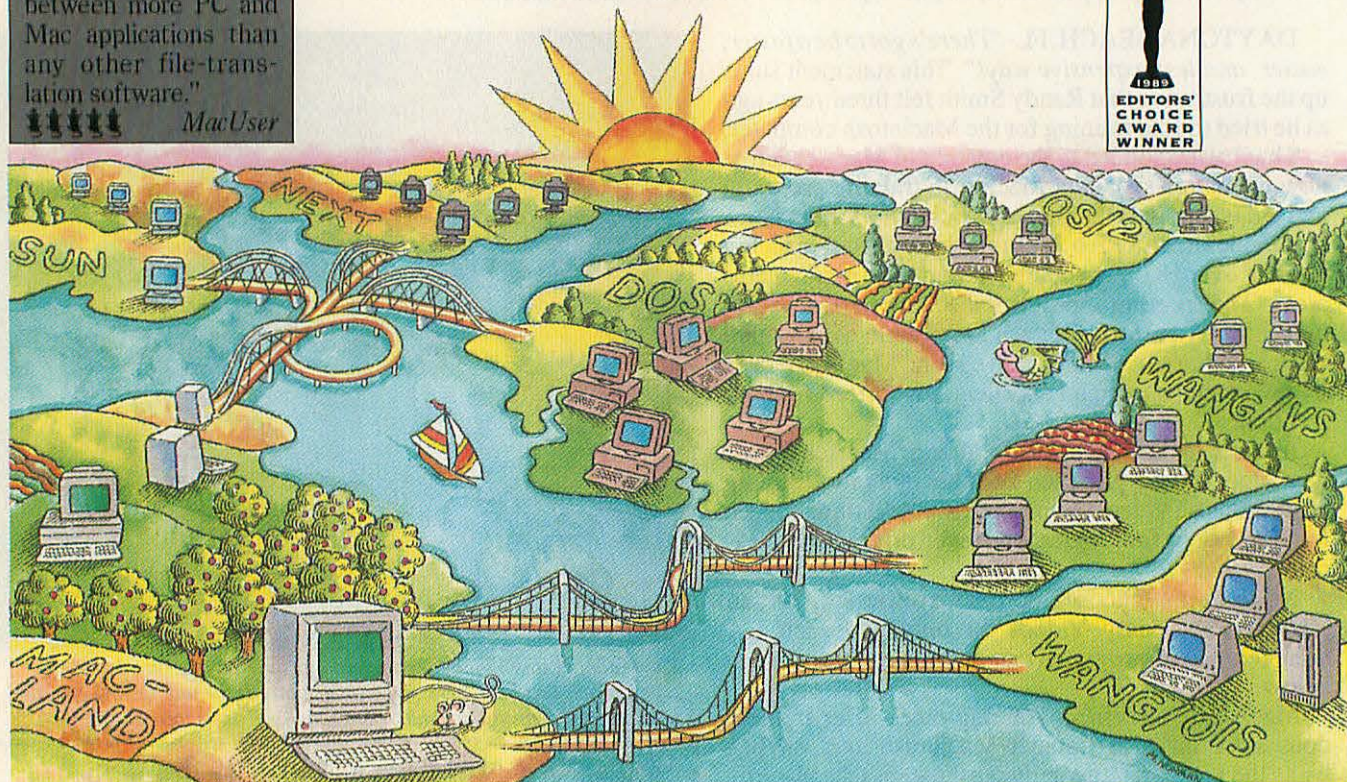
©1990 Florida Marketing International, Inc.

NOW, MACLINK®PLUS TRANSLATES EVERYTHING UNDER THE SUN

"Still the standard...
offers more translations
between more PC and
Mac applications than
any other file-trans-
lation software."



MacUser



The award-winning software package that transfers and translates files between Macintosh and DOS or OS/2 programs now does the same for Sun worshippers. And for the NeXT world.

With MacLinkPlus/PC, you can now send files in either direction between Macintosh and virtually any other desktop environment. Files arrive in the new environment with the correct styles and formats in place—just as if they had been created there.

MacLinkPlus/Wang OIS and MacLinkPlus/Wang VS provide the same bi-directional connectivity between Macintosh and Wang.

TRANSFERS AND TRANSLATES

The MacLinkPlus/PC package arrives with everything you need—software, manual, a direct connect cable (a Hayes modem or compatible also works), and our full library of over 100 translators.*

If you don't need file transfer capabilities (maybe your Macs and PCs already share a network or server), then simply order MacLinkPlus/Translators. It's the same package without the cable and communications capabili-

ties. And, it's the ideal software purchase for anyone with a Macintosh FDHD SuperDrive or external drive that reads DOS disks.

INSTANT PASSPORT TO EVERYWHERE

Make incompatibility a thing of the past with the MacLinkPlus family of Databridge products. For the name of your nearest DataViz dealer, call 203-268-0030 today.

*takes advantage of special connections built into MacWrite® II from Claris™

All product names are trademarks of their manufacturers.



DATAVIZ
THE DATABRIDGE SPECIALISTS

Circle 281 on reader service card

They're No Angels

A PRISON USER GROUP GIVES AS GOOD AS IT GETS

BY DEBORAH BRANSCUM

A couple of years ago a man named Charlie needed information. He was taking college courses that gave him access to a Macintosh, but not much more. He had outdated programs, no manuals, and no teachers to talk to directly. So he

checked *Macworld's* 1988 user group directory and wrote to several MUGs asking for help. The Worcester (Massachusetts) Mac User Group was the only organization to respond, but it did more than simply write back. In February of 1989, volunteers began meeting monthly with Charlie and his friends, kicking off the Bad Apples, a special interest group for inmates of the Massachusetts Corrections Institution, Lancaster Pre-Release Facility.

"We went there thinking we would be teaching them everything from soup to nuts," says Ted Verdone, who is a regular at Bad Apple SIG meetings. "We found out the group was fairly knowledgeable. Since then a couple of them have bought their own Macintosh machines and they're doing quite well. Now, instead of my going over there and helping them, I go over there and ask them questions."

Like Charlie (who asked that we use his first name), several prisoners at Lancaster became interested in the Macintosh because of courses they were taking. They received assignments from college teachers via modem and sent their work back the same way. The students wanted information about the Mac but had no easy way to get it. "We decided that since these guys couldn't get to our meetings, we'd get a volunteer to go once a month," says David Peller, WMUG executive director. "They always have questions for us, lots and lots of ques-

tions. We got them a set of manuals, donated a copy of *The Macintosh Bible*, and let them copy a set of public domain software. They've been doing great."

The Bad Apples have all the problems of a typical user group. Maintaining membership is one, as people leave the program for parole. "We have had as many as ten people in the group; now it's down to four," says Verdone. Charlie says the group is trying to rebuild by appealing to the college students at the prison.

Another familiar problem is technical support. Charlie, who practices what he calls "bedtop" publishing in his 6-by-9-foot room, writes a column for *RAMblings*, the WMUG newsletter. In the September issue he described problems with a printer: "I must rewire everything from scratch every time I go to press. With switches being located in awkward, out-of-the-way places, I leave them on and use the cord as the on/off mechanism. The result was that I fried the circuit board. The next morning I spent a solid half hour of consecutive dialing to reach the technical service 800 number in New Jersey and got nothing but a busy signal. I made several attempts on three or four occasions during the day and finally made a call to the store where it was purchased. The clerk said he couldn't tell what was wrong over the phone, so 'bring it in.' Yeah, sure. I'll just hop into the warden's cruiser,



turn on the blue lights, and zip into Worcester with my printer tied on the luggage rack."

"It's interesting to see how hungry for information these guys are," says Peller. "They wait all month for us to get there and can't thank us enough for coming. And since they've been up there, they're starting to make money with the Mac." Despite the headaches of being a Mac fan in prison, Charlie has become a whiz at Microsoft Word 4.0, HyperCard, and Excel and can contribute expertise to WMUG in several areas. "The Worcester Macintosh Users group has been sending people over every month," says Charlie. "We, in turn, have been able to teach them what we've learned." One former member, now on parole, developed real-estate-management software while in prison. He is now preparing to buy a Macintosh and use the software in his business. Charlie hopes to develop a specialty in custom spreadsheets for small businesses, work he is beginning now and can carry with him when he leaves Lancaster.

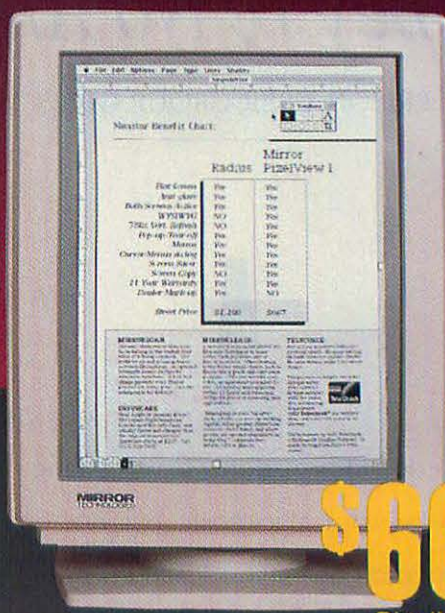
(continues)

Introducing An \$1,100 Display System For \$667



\$897

PixelView II



\$667

PixelView I

**"I want you to test drive one for 30 days.
Love it or return it!"**

R. Eibensteiner

Ronald Eibensteiner, President/CEO

"I used to think a large screen was a luxury. Now I can't live without it!"

Until now, high quality large screen displays cost more than a Mac Plus. Once I got over the sticker shock, I found that a large screen display was the greatest productivity enhancement I'd experienced. I challenged our own engineers to build display systems with the quality and features of the market leader at prices anyone can justify.

PixelView™ . . . it didn't happen overnight!

We sourced tubes from the same manufacturer as Apple. We chose the same screen phosphor used by Apple and Radius, but to completely eliminate irritating flicker, we boosted our vertical refresh rate to 78hz. Then we added enhancements like pop-up menus, enlarged cursor and menu options, screen saver and screen copy. And believe it or not, we did it at a \$667 price!

15" Portrait Display	Radius	Mirror
Flat screen	yes	yes
Anti-glare	yes	yes
Both screens active	yes	yes
WYSIWYG	no	yes
78hz vertical refresh rate	no	yes
Pop-up/tear-off menus	yes	yes
Cursor sizing	yes	yes
Menu bar sizing	yes	yes
Screen saver	yes	yes
Screen copy	no	yes
One year warranty	yes	yes
Dealer markup	yes	no
Street price	\$1,100*	\$667

* This was the best price we could find on a Radius FPD system.* (2/29/90)

From Mac Plus to Portable—we've got you covered.

We have PixelView display systems for the Mac Plus, SE, SE30, II, IIX, IICX, IICI, and Mac portable! And PixelView systems come in single or dual page screens.

**Take one for a test spin.
(But don't say I didn't warn you!)**

Take my modem. Take my (gulp) hard drive, but leave me my monitor! I feel that strongly, and believe you will too. Don't go another day squinting and scrolling! Try any of our display systems for 30 days. If you aren't convinced that your money was well spent, we want it back! **99**

**MIRROR
TECHNOLOGIES**

Call us today at

1 800 654-5294

Buy At Factory Prices!



V40 40Mb Hard Drive

How can we sell our New V40 for \$447? This price breakthrough is made possible by new drive technologies and our volume purchases. The V40 drive ships formatted, tested and loaded with 10Mb of software and includes all the features found on our other drives; cables, international power supplies, external SCSI switching, and cooling fan. One year warranty. Sorry, no dealer inquiries.



20Mb Internal Hard Drive

Sleek, fast, and quiet. International power supply, SCSI switching, fan, and cables are standard equipment. Shipped formatted, tested and loaded with over 10Mb of software. Internal and external models available for most Macs. Two year warranty.

Model	Mb	Int.	Ext.
M20	20	\$367	\$447
M30	30	\$397	\$497
M45	45	\$467	\$547
M60	60	\$597	\$677
M80	80	\$667	\$747



MP-Series 40Mb Internal

These are the premium drives that reviewer's rave about! Similar to the M Series, except our MP Series drives contain the fastest mechanisms in the industry (the slowest of which is 19ms!). Internal and external models available for most Macs. Two year warranty.

Model	Mb	Int.	Ext.
MP40	40	\$467	\$567
MP80	80	\$797	\$887
MP100	105	\$857	\$947
MP170	170	—	\$1497
MP290	290	—	\$1997
MP580	580	—	\$2997



RM600 Erasable Optical

If you're saving huge files (like 24 bit images, scans, or large data-bases), the RM600 is the right solution for you! Our RM600 erasable optical delivers disk storage at the lowest cost per Mb. We've incorporated second generation technology to bring you the greatest speed and industry-wide compatibility. Full ISO/ANSI compliance. The RM600 incorporates our international power supply, SCSI switching, and whisper quiet cooling fan. One year warranty.



RM42 45Mb Removable

Built around the Eddy Award winning SyQuest technology that has become the defacto standard for Macintosh removable media drives. With an average access time of 20ms, the RM42 is faster than most hard drives! The RM42 incorporates our international power supply, SCSI switching, and whisper quiet cooling fan. Two year warranty.



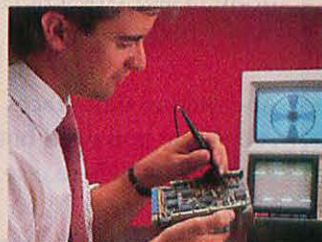
VS300 Flatbed Scanner

The VS300 delivers crisp line art and dithered halftones at a fraction of the cost of most scanners. Complete with full function scanning software that even allows the VS300 to be used as a desk accessory! Byte magazine said it best: "If it were my money, I'd buy the Mirror... It's price/performance ratio is unequalled." And for a limited time, we're throwing in Zedcor's DeskPaint™ graphics software (\$99 value) and Olduvai's Read It!™ optical character recognition software (\$495 value) at no additional charge!



T150 Tape Backup

Don't settle for a tape backup system that's designed around a cheap audio cassette derivative! Our T150 is a European engineered drive (Siemens of Germany) that packs 150Mb of your precious data onto solid 3M DC600 type cartridges, at 3 times the speed of most competing solutions. And it's painless! Our custom software facilitates automated (unattended) backups, mirror-image, file by file, or incremental backups.



DriveCare

Dead Ehman or Apple Drive? Our experts can breathe new life into almost any fixed or removable hard drive. And we recover data too! SuperMac, Jasmine, Rodime, CMS MacBottom, and others. 20-500Mb. They're all welcome! (ie: 40Mb start at \$277). Call our Technical Support Hotline today for details! 612-633-2105.

MIRROR
TECHNOLOGIES

TO ORDER CALL
TOLL FREE

1 800 654-5294

TECHNICAL SUPPORT HOTLINE: (612) 633-2105 Hours: Mon-Fri 8am-5pm CST

2644 Patton Road, Roseville, Minnesota 55113 (612) 633-4450 FAX: (612) 633-3136

Circle 424 on reader service card



All prices/specifications subject to change without notice. Call for current pricing, warranty, and promotional details. Mirror and MirrorImage are trademarks of Mirror Technologies, Inc. All other brand and product names are trademarks or registered trade names of their respective holders. No surcharge for Visa, MasterCard, Discover, and Telecheck.

Circle 511 on reader service card.

The Aetna Hose, Hook and Lad-
(continues)

Death Taxes Software Piracy



We can save you from one of them.

Sorry. Death we can't do anything about. As for taxes, when you use our product you'll probably wind up paying more. But software piracy: there we offer some help. Our family of software protection devices (dongles) have improved unit sales for over 2,000 companies around the world. Our products can be used in the Macintosh, MS-DOS, and OS/2 environments.

Build Your Own Custom Protection Environment

Use our patented "dual-locking" ASIC chip as the basic building platform. Next, add options like: on-the-fly read/write memory, write-once or multiple-write locking codes. Then add your own programming creativity to build a

protection environment best suited to your product.

Users attach the device to their SCSI port, and programs won't run without it. Back-up copies, hard disk and AppleTalk operation are not interfered with.



Your Intellectual Property Belongs To You

And if you don't protect it, who will? Our products offer the most equitable way to protect your interests without sacrificing the rights of your customers. Call us today for information and demonstration units.

Software Security



1011 High Ridge Road - Stamford, CT 06905

1-800-333-0407 ext. 106

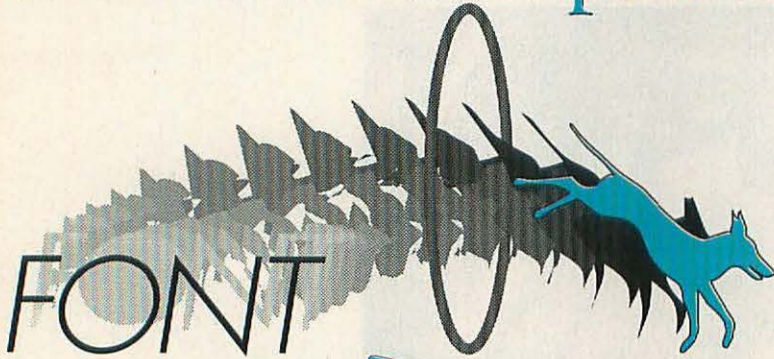
203-329-8870 Fax 203-329-7428 BBS 203-329-7253

AppleLink™ D2379

Macintosh, AppleTalk are trade marks of Apple Computer Inc., Activator, Mactivator are trade marks of Software Security, Inc. illustration: detail from Michelangelo's Last Judgement

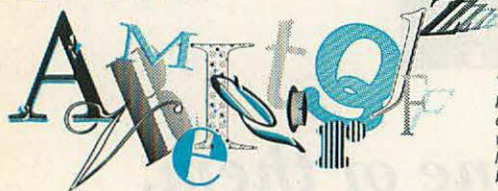
Circle 463 on reader service card

Now you *can* teach an old font new tricks. With Metamorphosis.



With Metamorphosis, your fonts can
veritably jump through hoops!

These are standard PostScript outlines -
converted by Metamorphosis from an
assortment of commercial fonts.
Recognize any of your favorites?



Metamorphosis™ provides a solution for
one of the major frustrations with existing
PostScript® type: the inability to access the
outlines. With Metamorphosis, you can now
manipulate type outlines in your favorite
drawing programs and really get the most
out of using your fonts!

Metamorphosis is a unique utility for
converting your PostScript fonts into edit-
able outline formats. The outlines that
Metamorphosis produces are identical to
the outlines of your original font.

Altsys is the leader in Macintosh font editing and design software. With
Fontographer® and The Art Importer®,
Altsys provides high
quality software for
printing, publishing,
desktop publishing,
and graphic arts.



The Altsys Family of quality PostScript
products for Creative Types.

Suggested Retail Prices
Metamorphosis: \$295.00
Fontographer: \$495.00
The Art Importer: \$179.00

Use your favorite PostScript
drawing programs to create
designs and logos from type
outlines.

You can modify any
PostScript typeface by
converting it to outlines
with Metamorphosis -
like these variations on
ITC Garamond™.

SMALL CAPS
x-height
Condensed
Gray Scale

By using any Adobe® PostScript printer,
Metamorphosis converts your fonts into
editable outlines for use in Aldus® FreeHand®,
Adobe Illustrator®, or Brøderbund®
TypeStyler®. You can also use them in
Fontographer® to create custom type. And
those fonts can be used in any Macintosh
application.

With all that you have invested in Post-
Script and PostScript fonts, isn't it time you
tried some new tricks with Metamorphosis?

ALTSYS
Altsys Corporation
720 Avenue F #109
Palo Alto, CA 94301
(415) 424-4888

APRIL

APPLE WARRANTY WATCH



76 Months
of Inadequate Warranty

der Company (known as the Newark
[Delaware] Fire Department) and the
William M. Singerly Steam Fire Engine,
Hose, Hook and Ladder Company, No.
1, of Cecil County (known as the Sing-
erly Fire Company) of Elkton, Mary-
land, formed the group to share com-
puter information and techniques,
according to Farrell. The all-volunteer
departments want to make the most
of recently purchased Mac hardware.
Once established, this user group may
expand to include other local aid de-
partments. Contact Farrell at 301/398-
3355 or his brother John in Newark at
302/454-3307 for more information.

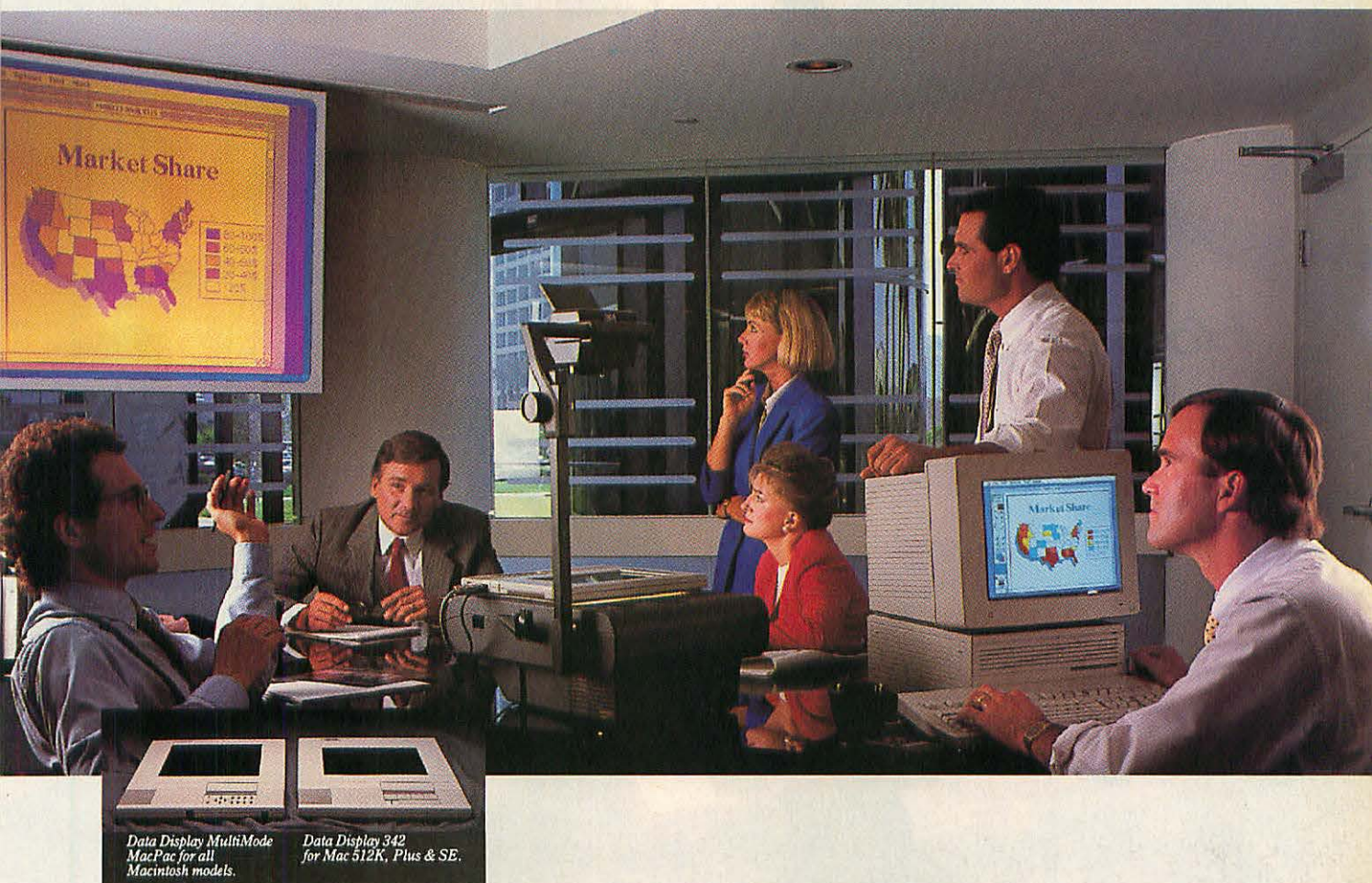
Consultants Gather

April is a busy month. The Macintosh
Consultants Network is holding its
Fourth International Macintosh Con-
sultants Conference at the Rancho
Bernardo Inn in San Diego, April
27-29, 1990. Jim Sheldon-Dean, MCN
executive director, says one day will
be devoted to specific consulting is-
sues; the remaining time will be de-
voted to communications, connectiv-
ity, and project-management topics.
MCN can be reached for details at 206/
453-2729 or on Connect (MCN). ■

Send nominees for sainthood to Service
Heroes, Macworld, 501 Second St., San Francisco,
CA 94107 or via AppleLink (Macworld1) or Con-
nect (Branscum). Conversely, drop *Conspicuous
Consumer* a line if a company is ignoring you. I will
help solve your problem, if I can. If your user group
is sponsoring an event, please get in touch.

Circle 35 on reader service card.

Power Meeting.



Become part of the Desktop MediaSM revolution. Power up your Mac with the Proxima® Data Display® and make your meetings come alive.

Macintosh changed the possibilities for personal creativity and productivity forever. Now, by adding a Proxima Data Display from Computer Accessories Corporation, you can bring the same creative freedom to on-line, interactive group working sessions, training meetings, and presentations.

And it's all so easy.

Just plug the Data Display into your Mac. Set it atop any conventional overhead projector. And project precisely the same images shown on your computer screen – in dramatic simulated color or high-contrast monochrome – to give all your Mac graphics maximum visual punch.

With a Data Display, you can focus group attention on exploring what-if scenarios. Perform on-the-spot problem solving. Fine tune ideas in brainstorming sessions. And document spontaneity. All of which can turn a sales or financial discussion, training or education

gathering – any data-sharing session – into a more productive and more creative meeting.

Use your existing software exactly as you always have. Data Display works as a perfect enlargement of your Mac's monitor. For example, use Aldus Persuasion™ and the Data Display for "live delivery," high-impact presentations. Microsoft Excel™ for group financial analyses or HyperCard® for conducting customized interactive training sessions. The opportunities and the potential to increase creativity and efficiency are limited only by your imagination.

Proxima Data Displays are available in two Macintosh compatible models. The Data Display MultiMode™ MacPac gives you complete Macintosh compatibility (all Mac IIs and compact Macs) and the best representation of color available to show off your Macintosh color graphics.

It comes with its own remote control so you can access both the Data Display and your Macintosh from anywhere in the room.

The Data Display 342, compatible with all compact Macs, sets the monochrome standard for high-contrast and bright, crisp images – even in lighted rooms.

Get the details on how Proxima Data Display power can make your meetings come alive. Call us for your nearest dealer at 800/582-2580, (in California 800/582-0852).

Small, light and portable, Proxima Data Display goes where the action is.



PROXIMA
by Computer Accessories Corp.

Circle 171 on reader service card



Hand Tools.

You know what it's like.

If you're in graphic arts, you know there's a lot of grunt-work.

Like rubbing-down type. And tracing and filling letters to comp-up headlines.

Trying to get true colors from a junkyard of dried-out markers.

Inking and re-inking rules and borders because of clogged pens.

T-squaring elements to be sure they're aligned and square.

Counting characters.

Spinning proportion wheels.

Tracing off the Lucy.

Wouldn't it be nice to spend more time exercising your brain instead of

your wrist? Exploring concepts? Refining layouts? Trying "What if" design options? Or experimenting with color combinations?

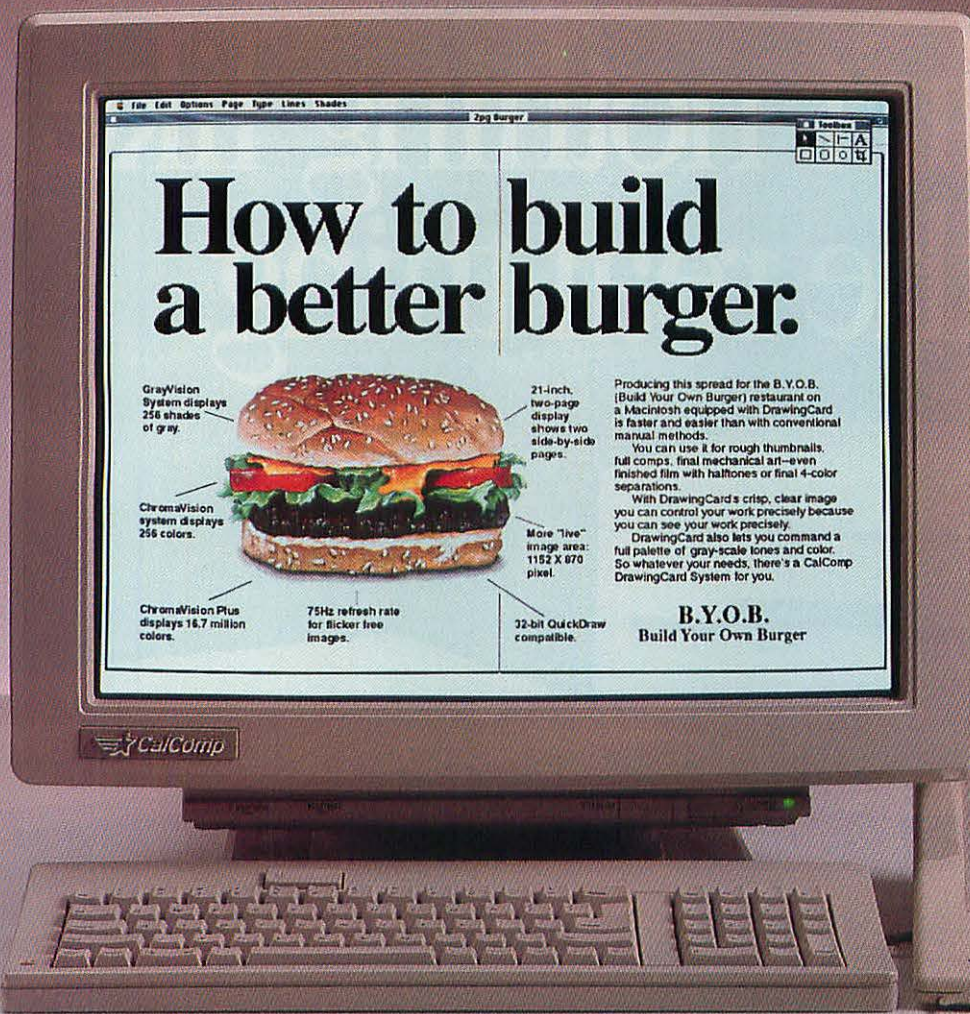
That's exactly what you can do using today's advanced layout, design, and illustration programs, the Macintosh II™ family of computers and a CalComp DrawingCard™ display system.

CalComp large screen displays help you get the most from your Macintosh. For one thing, they never let you lose sight of the big picture. DrawingCard is the first 21" system to give you two full pages of color side-by-side at actual size. That's critical when you're

designing double-track ads, brochure spreads or creating a large horizontal illustration.

DrawingCard's flat screen eliminates distortion and with its excellent resolution and contrast you can see the effect of small changes in the colors right on the screen. Or evaluate the visual effect of half-point variations in type size and leading. You can even see the precise amount of letter overlap when you set your headlines "tight and touching."

And with DrawingCard displays, what you see on the screen is what you get on your printer because screen resolution is true 72 dpi.



21" ChromaVision Plus

Power Tools.

There are three DrawingCard systems to choose from. Our 8-bit GrayVision display system with 256 shades of gray is ideal for desktop publishing and design projects using line art and black-and-white halftones.

Our 8-bit ChromaVision system with 256 colors is the perfect match for the great majority of desktop pub-

lishing, design and illustration projects where 4-color reproduction is needed.

And our 24-bit ChromaVision Plus system (shown above) with 16.7 million colors is the ultimate display where color accuracy is especially critical such as color retouching.

DrawingCard display systems are just one way CalComp, a worldwide

graphics leader, supports the arts on Macintosh. There's also WIZ,TM a new mouse system that combines the features of a traditional mouse with the power of a graphics pad. Plus a complete line of high-performance printers.

So stop using those antique hand tools today. After all, the graphic arts should be full of inspiration, not perspiration. For more information about DrawingCard displays, call:

1-800-CalComp.

In Canada, call: (416) 635-9010.

Circle 122 on reader service card

**We draw on
your imagination.TM**

CalComp

A Lockheed Company

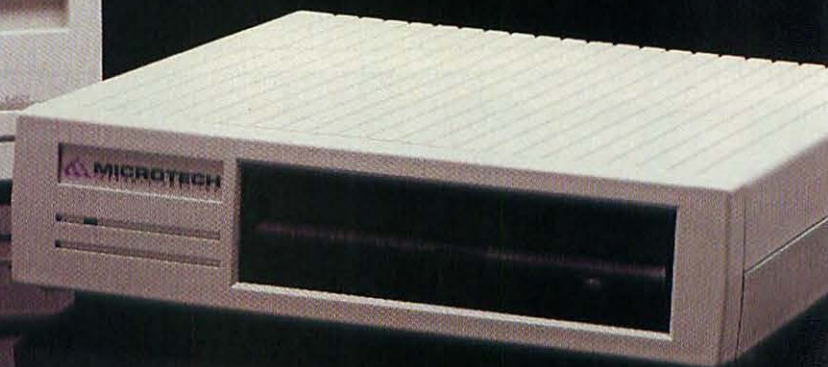
21" GrayVision

21" ChromaVision



DrawingCard monitors feature 75Hz refresh rate for flicker-free performance, large live area (1152x870 pixels) and 72dpi screen resolution for true WYSIWYG.

Ain't nothing like the real thing.



Quality speaks for itself. Optical and Removable drives by Microtech.

Microtech OR650 Optical Disk Drive.
650MB capacity. Rewritable. Erasable.
Two year warranty.

\$4795

Additional cartridges available. *Preformatted.*
One year warranty.

\$249

Microtech R45 Removable Cartridge Drive.
45MB capacity.
Two year warranty.

\$1099

Additional cartridges available.
One year warranty.

\$99

R45
INCREASED
PERFORMANCE!
FASTER ACCESS
TIME!

All drives bundled with MacTREE Plus, DS Backup,
and demos of MICROSOFT EXCEL and 4th DIMENSION.

1-800-325-1895 In CT (203) 468-6223



MICROTECH
INTERNATIONAL, INC.
158 Commerce St., East Haven, CT USA 06512

© 1989 Microtech International, Inc. All product names and logos are trademarks or registered trademarks of their respective owners. Prices and specifications subject to change without notice. MasterCard and Visa accepted at no extra charge.

Circle 458 on reader service card



The Color Squeeze

IMAGE PROCESSING DEMANDS A LOT OF RESOURCES,
BUT HELP MAY BE ON THE WAY

T

BY BRUCE F. WEBSTER

he Macintosh is suffering from graphical overload. The advance of image technology has overwhelmed the memory, storage, and processor resources of all but the most powerful (and expensive) Macintosh systems. Put simply, color is

running out of space. Try this quick demonstration. Turn on a classic Mac (Mac Plus, SE, or SE/030) and create a screen shot by pressing Shift-⌘-3. The resulting PICT file is 21K in size. You can fit nearly 40 of these on a regular 800K floppy disk.

Now try using a Macintosh IIfx with a Spectrum/8 color display board and a large (1024-by-768-pixel) screen. Launch PixelPaint, open a new document, stretch the window to the full screen size, and fill it with some paint color. Save it and look at the file size—over 700K. You can fit just one of these on a regular 800K floppy.

Finally, hook up a Sharp or Howtek 300-dpi color scanner to the Mac IIfx. Try to scan in a full 8½-by-11-inch image at 300 dots per inch and 8 bits per pixel. Chances are you can't do it; you'd need over 8 megabytes of memory just to hold the image. The ratio of this image's size to that of a classic Mac screen shot: 385 to 1.

This color explosion has occurred in less than three years' time. Since the introduction of the Macintosh II in 1987, hardware and software resources have not been able to keep up. And new developments in color imaging—color separation, 3-D solid modeling, animation—continue to push the limits of what's possible.

Shrink to Fit

Major problems result from the tremendous inflation of image size. You can overcome these limitations in capacity and/or bandwidth to a certain degree by spending lots of money on peripherals, but the return on your investment diminishes quickly. In short, color is expensive.



But that may not always be the case. What if there's a different approach? Instead of spending money on memory, storage devices, and accelerators, what if there were a way to make the large color images smaller?

Several compression utilities are now on the market, and some are available as shareware and public domain software. Typically these programs achieve only 40 percent to 60 percent compression on a given file. That's a start, but reducing an 8MB image to 4MB doesn't solve all your problems. For instance, since these utilities are not integrated within imaging software, you may run out of memory or disk space before you even have a chance to compress the image.

Another issue is that of compression and decompression speed. Since you're dealing with very large images, you may find yourself waiting several minutes (or longer) while an image is processed. Part of the problem is just system speed, but part stems from the need for more complex processing to achieve higher compression than what

we have now. This can be a serious limitation if you need to compress a file on the fly, such as while scanning in an image.

Also, you're often faced with a trade-off between image quality and storage. Some algorithms result in high *(continues)*



Never underestimate the importance of a great backup system.

Just how risky is running a hard disk without backup, anyway?

Would you believe almost a half-million dollars? Studies indicate that's how much it could cost to restore a typical 90 megabyte hard disk of business or engineering data. Of course, that doesn't include loss of income while you find another job.

You can avoid the sinking feeling that accompanies data loss by using MaxStream™, the convenient, affordable Macintosh® tape backup system from Maynard.

MaxStream's highly reliable data verification methods guarantee that even if your hard disk takes a dive, your data will have a soft landing.



MaxStream's sizzling speed leaves other tape backup systems in the clouds. And easy-to-use backup and restore features include scripting for automatic, unattended operation storing up to 2.2 gigabytes—a network full of data—without intervention. MaxStream even lets you use tapes to transfer data from your IBM PC® to your Macintosh. For product information and a free demo disk call 1-800-237-4929, or write: Maynard Electronics, 460 E. Semoran Blvd., Casselberry, FL 32707. And make the jump to better backup.

Maynard Electronics
An Archive® Company

Archive is a registered trademark and MaxStream is a trademark of Archive Corporation. Macintosh is a registered trademark of Apple Computer, Inc. IBM PC is a registered trademark of International Business Machines.

Circle 263 on reader service card



Electronics for Imaging uses an image shot by photographer Morton Beebe to demonstrate its compression technology. This original image, 2.1MB in size, was digitized using a slide scanner.



This image shows the result of 22 to 1 compression, which brought the file size down to 0.10MB. Some small artifacts are visible along the top cable of the bridge.



This image shows the result of 39 to 1 compression which reduced the file size to 0.05MB. Notice the artifacts along the cables and top of the towers.

MORTON BEEBE

compression, but with a significant loss of information. When the image is decompressed, gaps, patterns, and other artifacts appear in the image. Repeated compression and decompression can make image quality worse.

Finally, there is the issue of coordination: if I compress an image and

give it to you, will you have the right utility to decompress it? More important, if the scanner-control software compresses the image you are scanning in, can the image-manipulation software that you want to use correctly decompress that image? To achieve this kind of integration, there

needs to be a standard of some sort.

Slouching toward a Standard

An international committee is trying to do just that. The Joint Photographic Experts Group (JPEG) has created a compression-and-decompression algo-
(continues)

Imagine Losing Everything In Your Mac.



The first affordable 800x400 PostScript® laser printer.

Until now, you had a choice: compromise your graphic standards with a 300 x 300 laser, or compromise your finances with a higher resolution printer.

Now there's the NewGen TurboPS/400 with a standard printing resolution of 400 x 400 dpi. That's almost twice the resolution of standard 300 dpi printers — at about the same price.

If you need even higher resolution, you can upgrade to 800 x 400 dpi with our resolution upgrade kit. You'll get the resolution you need to print fine-lined graphics and smooth fonts, and save time and money by printing your own masters. And best of all, you can get 800 x 400 resolution at about half the cost of high-priced imagesetters.

No wonder our competition is fading. **It's faster, too.**

NewGen's dual-processor controller design, utilizing a 20MHz graphics RISC



800 x 400



300 x 300

processor, gives us the fastest PostScript-compatible desktop laser you can buy. In fact, it will print most pages three to five times faster than the Apple LaserWriter® IINTX and blow the doors off anything else in its class.

IBM® and Macintosh® compatibility.

The TurboPS/300 gives you plug and play Macintosh compatibility — with LaserWriter IINTX compatibility, AppleTalk® interface, Adobe® downloadable font

support and 35 Mac screen/printer fonts.

IBM compatibility includes HP LaserJet II® HPGL and Epson® emulations, and parallel/serial interfaces.

Free test results.

To get the full story on the high-resolution, high-speed TurboPS/400, call NewGen at (714) 641-8900. We'll send you a package including timing test results, print samples and the lowdown on our other remarkable laser, the TurboPS/300.

We'll also send the name of a NewGen reseller in your area. So you can see for yourself. And believe.



NewGen Systems Corporation

17580 Newhope Street
Fountain Valley, CA 92708
Telephone (714) 641-8900

NewGen, NewGen Systems Corporation, NewGen logo, TurboPS/300 and TurboPS/400 are trademarks of NewGen Systems Corporation. All other brand product names are trademarks or registered trademarks of their respective companies.

Adobe and PostScript are registered trademarks of Adobe Systems, Inc. NewGen's compatible interpreter is compatible with Adobe PostScript.

Circle 409 on reader service card

rithm designed to work with large color images. JPEG's goal is to achieve high compression ratios with minimal degradation by throwing away "unimportant" information in the image.

As defined by JPEG, the algorithm uses three steps to compress an image. First, it divides the image up into 8-by-8-pixel squares and applies a discrete cosine transform (DCT) to each square. Because the DCT is a member of the Fourier transform family, the result is 64 frequency values. Second, these frequencies are put through a quantization algorithm to eliminate unimportant frequencies (based on studies of people's color-perception thresholds). Third, the remaining values are run through a Huffman coding scheme, which uses a predefined table to encode each remaining value as a variable-length string of bits, with the most frequently occurring values using the fewest bits.

Decompression reverses the process. First, the Huffman bit strings are decoded. Next, the quantization algorithm recreates a set of 64 frequen-

cies. Finally, an inverse cosine transform (ICT) is applied, resulting in an 8-by-8-pixel square.

The JPEG algorithm is designed to let users adjust the compression ratio, trading off image quality for greater compression. Thus, you might increase compression if picture quality or integrity were not as important as, say, simple recognition of the general image. Conversely, you could bring down the compression to maintain high image integrity.

JPEG's intent is to establish this algorithm as a standard, not just for computers, but for any application requiring storage, manipulation, or transmission of large color images, such as high-definition TV (HDTV). At least two companies—Electronics for Imaging (EFI) and Creative Circuits Corporation (C³)—want to aid JPEG in that effort and earn themselves some money in the process.

Software versus Silicon

EFI (415/742-3400) of San Bruno, California, has developed and released

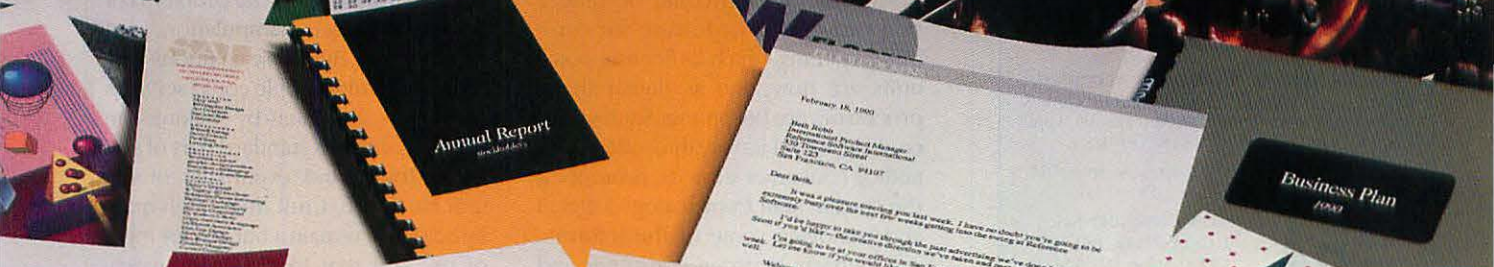
an implementation of the JPEG algorithm in a software library called Ecomp. EFI claims that Ecomp provides a compression ratio of 20 to 1 or better for color images, with only a minor loss of quality on initial compression, and with no additional loss on repeated compression-decompression cycles. That kind of compression lets you fit several large-screen, 32-bit color images (more than 3MB each) onto a single 800K floppy disk.

EFI's results look impressive. There is no visible degradation in the sample image of the Golden Gate Bridge after an 11-to-1 compression, and little degradation after a 22-to-1 compression. Even a 39-to-1 compression-decompression cycle left the image relatively intact, with visual artifacts confined mostly to the portion of the image containing the bridge's support cables.

Unfortunately, speed is not Ecomp's strongest feature, due to the heavy math involved in the process. Compression and decompression pro-

Now, Imagine Getting It Back.

Response To
Downtown
Prised Us.



You'll get your data back fast with SUM II.[™] New SUM II recovers crashed hard disks and accidentally thrown away files so effectively, *MacWEEK* magazine calls it "the best set of utilities available for file and disk recovery."^{*}

SUM II protects data, speeds up hard disks, and even includes a complete backup program. It's the

best-selling, highest-rated data protection and recovery program for the Macintosh.^{**} Imagine what it can do for you.

Get SUM II today! See your dealer or call (800) 228-4122 Ext. 688G for information.



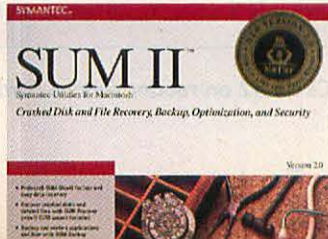
Symantec Corporation, 10201 Torre Avenue, Cupertino, CA 95014. (408) 253-9600.

^{*}Steve Costa, *MacWEEK*, 10/3/89. ^{**}*MacUser* 1989: Editor's Choice, 5 Mice Rating, and Eddy Award for Best Utility. *Macworld's* 1989 Reader's World Class Award. *Publishers' 1989 Reader's Choice Award*. Best seller through National Distributors: Ingram Micro D, Softsel, Kenfil. SUM is a trademark of Symantec Corporation.

© 1990 Symantec Corporation

SYMANTEC.

The #1 Data Protection
and Recovery Program



Circle 237 on reader service card.

Macintosh IIci/105 Color System



This complete ready-to-run Macintosh IIci system includes:

- 25 Mhz 68030 processor
- 1.44 Meg FDHD Disk Drive
- Built-in Video Card
- Quantum 105 Meg Hard Drive
- 5 Megs of Memory
- NEC MacSync Hi-Res RGB Monitor w/Tilt & Swivel Stand
- MacPro 105 Extended Keyboard
- Desktop Mouse & Mouse Pad
- HyperCard & MultiFinder Software
- All necessary cables & manuals
- 3.5" high density diskettes (10)

System Price \$6739 Pkg #9003

180 Day Performance Guarantee

In addition to CDA's 30 Day Money Back Guarantee, all products are guaranteed for a full 180 days to be free of defects, or we will repair them at no charge.

Call! for weekly specials, pricing updates, our free Macintosh Catalog, and more information on our complete line of Macintosh systems, hardware, software and accessories.

Visa, MC, Amex, & Discover accepted.

CDA is not an authorized Apple dealer. Apple & Macintosh are registered trademarks of Apple Computer Inc. Prices subject to change.

Hours: Mon-Fri 9am-10pm, Sat. 9am-5pm, EST
Fax# (201) 832-9740

Ad #28-04

CDA Computer Sales
1 CDA Plaza, PO Box
533 Califon, NJ 07830

CDA
computer sales

Mallorder Exclusively Since 1980

US/Canada 800-526-5313

Outside US/in NJ 201-832-9004

Circle 32 on reader service card.

ceed at the same rate, processing about 10 kilobytes of decompressed image per second on a Mac II system. That may be bearable if you are working with smaller images (a 3MB image takes about 5 minutes). But that rate works out to about 18 minutes to compress or decompress a 10MB image, a speed I suspect most users would find intolerable and that would limit the use of Ecomp in real-time applications, such as scanning.

C³ (408/944-6300) of San Jose, California, is trying to eliminate that speed barrier. According to C³ representatives, the company has not only implemented the JPEG algorithm in software, but also in a custom silicon-chip design that is still in the prototyping stages. Company officials claim that the chip can decompress a 10MB image in 1/3 second, some 3000 times faster than the software implementation. According to C³, this rate is achieved by using some 300 levels of pipelining; in other words, the chip steps through 300 operations simultaneously. Furthermore, the chip is designed for parallel processing, allowing a hardware manufacturer to achieve faster compression and decompression rates by using several chips. C³ says that four of these chips should be able to do real-time (30-frames-per-second) decompression of full-color HDTV images.

If these claims are true, the chip (or something like it) could have significant implications for both computer and general consumer markets. For example, an image processing unit based on this chip could become a standard option or feature for computer systems, much as floating-point units are now, and as digital signal processors are becoming. Such a chip could also find its way into video (and audio) consumer devices, promoting the current shift from analog to digital and removing some of the information barriers between consumer and computer electronics.

Will Users Benefit?

EFI and C³ are targeting developers with their products by licensing their technology. The cost is a flat, one-time fee. EFI charges a company \$1000 for internal use and \$10,000 for use in products; C³ charges \$500 and \$15,000,

respectively. In both cases the higher figure allows a firm to use the JPEG algorithm in commercial products, with no per-copy royalties of any kind. The goal is to establish the JPEG algorithm as a software standard before implementing it in hardware.

That goal, however, is not being served by the pricing fees described. The simple truth is that we won't benefit from this or any other compression routine unless it's widely adopted. If EFI and C³ really want to set a standard, they should write simple compression and decompression utilities for all their target platforms and release them in the public domain, then cut their licensing fees to a half or a third of what they are asking now. The first move would establish a demand for applications that support the compressed image format; the second would allow more small developers to jump on the bandwagon (and would probably result in higher revenues, to boot).

Even with increases in processor speed, though, the JPEG algorithm is just too slow for effective, convenient use. The best solution is hardware; that same algorithm in silicon—an image processing unit like the C³ chip—needs to be a standard part of every Macintosh system that deals with large color images.

What we need now is strong leadership from Apple, which developed and released 32-bit QuickDraw without providing hardware and software solutions to the resulting bottleneck. Third-party companies are seeking their own answers to the problems of graphic storage, manipulation, and transmission. But those solutions may be incompatible. Apple could serve its customers and itself by making the JPEG algorithm a standard part of system software and, eventually, of system hardware. Until then, high-quality color will remain a burden for most of us. And that load will ultimately weigh down Apple in the fiercely competitive years that lie ahead. **M**

Contributing editor Bruce F. Webster is project manager at San Diego-based LaserGo. He can be reached via BIX (bwebster) and via MCI Mail (Bruce Webster).

**NOW THAT THERE'S A TOTALLY NEW DESKTOP PUBLISHING PROGRAM
WITH AN INTUITIVE USER INTERFACE, THAT ALLOWS FOR THE
PRODUCTION OF DOCUMENTS UP TO 999 PAGES IN
LENGTH, WITH TEXT EDITING CAPABILITIES
THAT MAY ACTUALLY RIVAL YOUR
WORD PROCESSOR, AS WELL AS
TYPOGRAPHIC AND LAYOUT
CONTROL TO SATISFY EVEN
THE MOST DEMANDING
DESIGNER, WHERE
DOES THAT PUT
PAGEMAKER?**

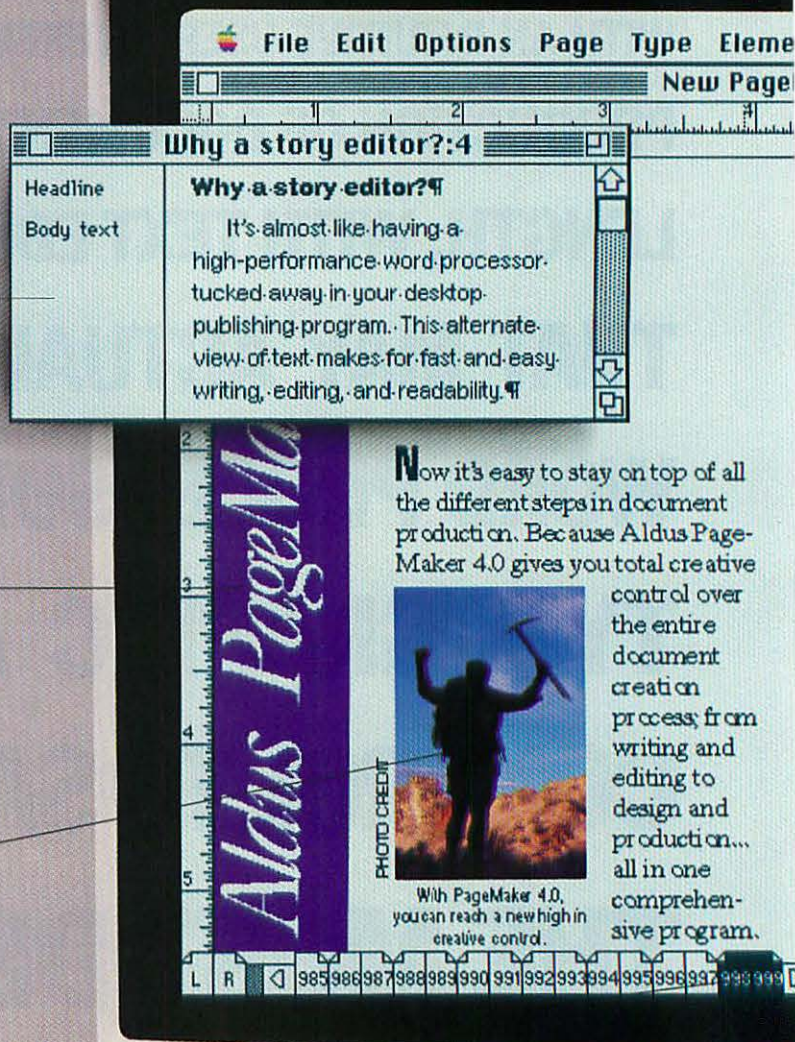
Now there's a Macintosh program that so greatly expands your publishing horizons, it can't be called just an upgrade for Aldus PageMaker®. It's an upgrade for all of desktop publishing. Because now you have total control—start to finish—over the entire process: writing, editing, design, and production. For any type of document, any length.

Write and edit with an integrated Story Editor™ that includes much of the performance of a stand-alone word processor. This alternate text-only view lets you spell-check, search and replace, change styles—and the layout view is automatically updated.

Create a look with type by rotating text in 90° increments, condensing or expanding type from 5% to 250%, force justifying lines to any specified width, or applying point-size-dependent track kerning across any range of text.

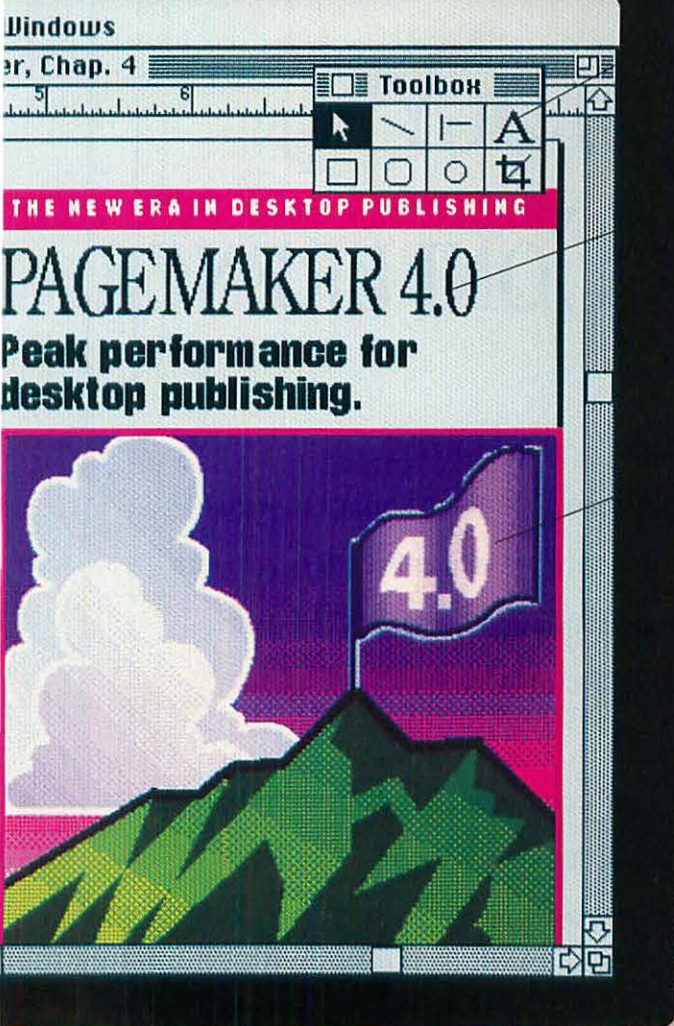
Keep up to date with the new Links management facility. Now you can automatically update a publication with the most recent versions of text and graphic files.

Build files up to 999 pages, and beyond. For long publications, combine files using PageMaker 4.0's Book command to create a common table of contents and index, and to chain-print the files.



ALL BY INTRODUCING THE

*Pantone, Inc.'s check-standard trademark for color reproduction and color reproduction materials. Aldus, the Aldus logo, and PageMaker are registered trademarks and Aldus PrePrint and Story



The PageMaker toolbox and pasteboard, along with 30 pre-designed layout templates, are some of the reasons why learning and using PageMaker is still so quick and easy.

To be precise, PageMaker 4.0's new typographic controls let you kern over any range of text, or for individual pairs to 0.01 of an em. Assign type sizes or leading from 4 to 650 points, in increments of 0.1 of a point.

Add the impact of color with imported TIFF images and EPS illustrations. Choose from PANTONE®, RGB, HLS and CMYK color models. Then create color separations using an OPI-compatible separator such as Aldus PrePrint™ (purchased separately).

For a brochure or the location of your nearest dealer, call 800-333-2538, Department 2L. **Better yet, PageMaker's National Road Show starts in March. Call 800-950-1989 for a schedule and free reservations.** Because the best thing about the new PageMaker is not what it can do now; it's what you can do now.



The Creative Edge
in Business.

ITSELF. NEW PAGEMAKER.

Editor are trademarks of Aldus Corp. Macintosh is a registered trademark of Apple Computer Inc. PANTONE® is a registered trademark of Pantone, Inc. ©1990 Aldus Corporation. All rights reserved.

special event

MACWORLD'S *FOURTH ANNUAL*

TECHNOLOGY and ISSUES CONFERENCE

June 27-29, 1990

SESSIONS WILL INCLUDE:

ADVANCED GRAPHICS

ANIMATION

MULTIMEDIA

END-USER PROGRAMMING

MAC AND LOCAL AREA NETWORKS

MAC AND MAINFRAMES/MINIS

DESKTOP PUBLISHING

SYSTEM SOFTWARE

MACINTOSH HARDWARE

The Technology and Issues Conference brings together third-party Macintosh hardware and software developers for a series of informal sessions to discuss the latest issues concerning the Mac community.

The setting for this year's conference is Marriott's Tenaya Lodge, situated at the southern border of Yosemite National Park. Sessions will begin on June 27 and run through June 29, 1990.



To register to attend the
**Macworld Technology and Issues
Conference**, fill in the coupon and attach it to
your check. Mail to: **Technology and Issues
Conference, Macworld Editorial, 501 2nd St.,
San Francisco, CA 94107**. Registration
is \$695; a \$100 discount applies
if you register before April 1.

NAME TITLE

COMPANY

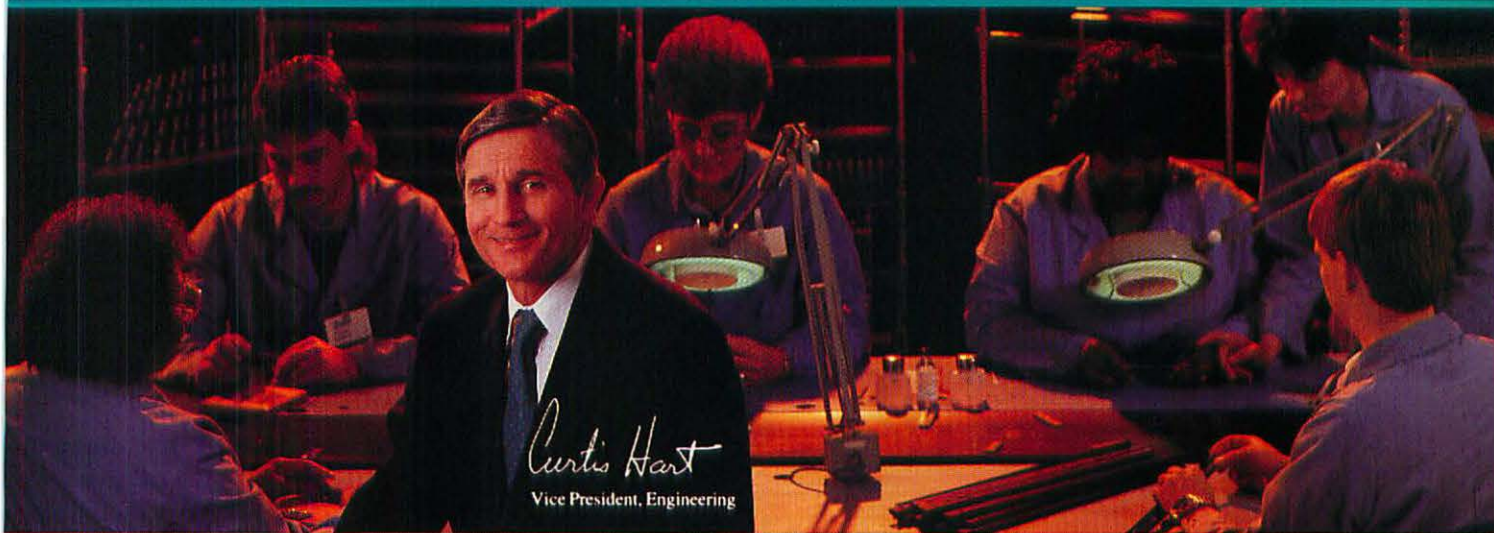
ADDRESS

CITY STATE ZIP

PHONE

☐ Please send me more detailed information about the Technology and
Issues Conference.

"When you order SIMMs from XeTel, you get top quality memory at below market prices."



Curtis Hart
Vice President, Engineering

Highest Quality

XeTel is a world leader in surface mount technology, supplying millions of memory modules to Fortune 500 computer manufacturers. Now, you can get the exact same quality memory direct from XeTel at below market prices.

Lowest Prices

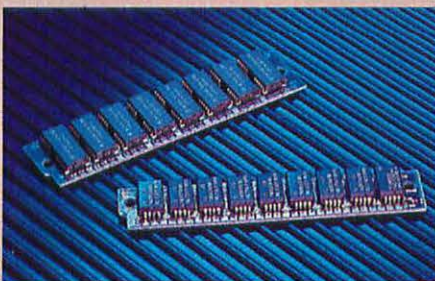
How can we sell for less? We purchase chips direct from the manufacturers and make modules here at our state-of-the-art facility. And, by selling direct to you, we've eliminated mark-ups by middlemen and resellers.

Factory Tested For Performance

XeTel's memory modules meet the same specs as the components in your MAC. In fact, the mechanical specs of our memory modules meet

JEDEC standards accepted by the industry.

To ensure maximum performance, each module undergoes 24 hour temperature cycling and extensive



XeTel
CORPORATION

8100 Cameron Road
Austin, TX 78753

Call 5 a.m. until Midnight M-F CT

1-800-388-7466 (Ext.12)

Call for quantity discounts!
VISA / Mastercard / COD
All orders shipped next day.

electrical testing at XeTel before it's ever shipped to you.

We also ship each module in a 3M static shielding bag to prevent static damage while in transit and include a static control wrist strap for you to use during installation.



Factory Backed Unlimited Lifetime Warranty

We don't just say our memory modules are superior, we prove it! If for any reason your module should malfunction, XeTel will replace it FREE. You pay only for shipping. Each shipment includes proper installation instructions. If further assistance is needed, our engineering staff is available to answer any questions.

More MAC Memory For Less.

SIMMs in 70, 80 and 100 ns speed.

SIMMs

256K x 8 (100 ns)
256K x 9 (70 ns) Memory Masters
1M x 8 (80 ns) Memory Masters
1M x 9 (80 ns) Microprocessors

Their Price	Our Price
NA	\$ 35.00
\$ 59.00*	\$ 50.00
\$ 99.00*	\$ 90.00
\$110.00*	\$ 99.00

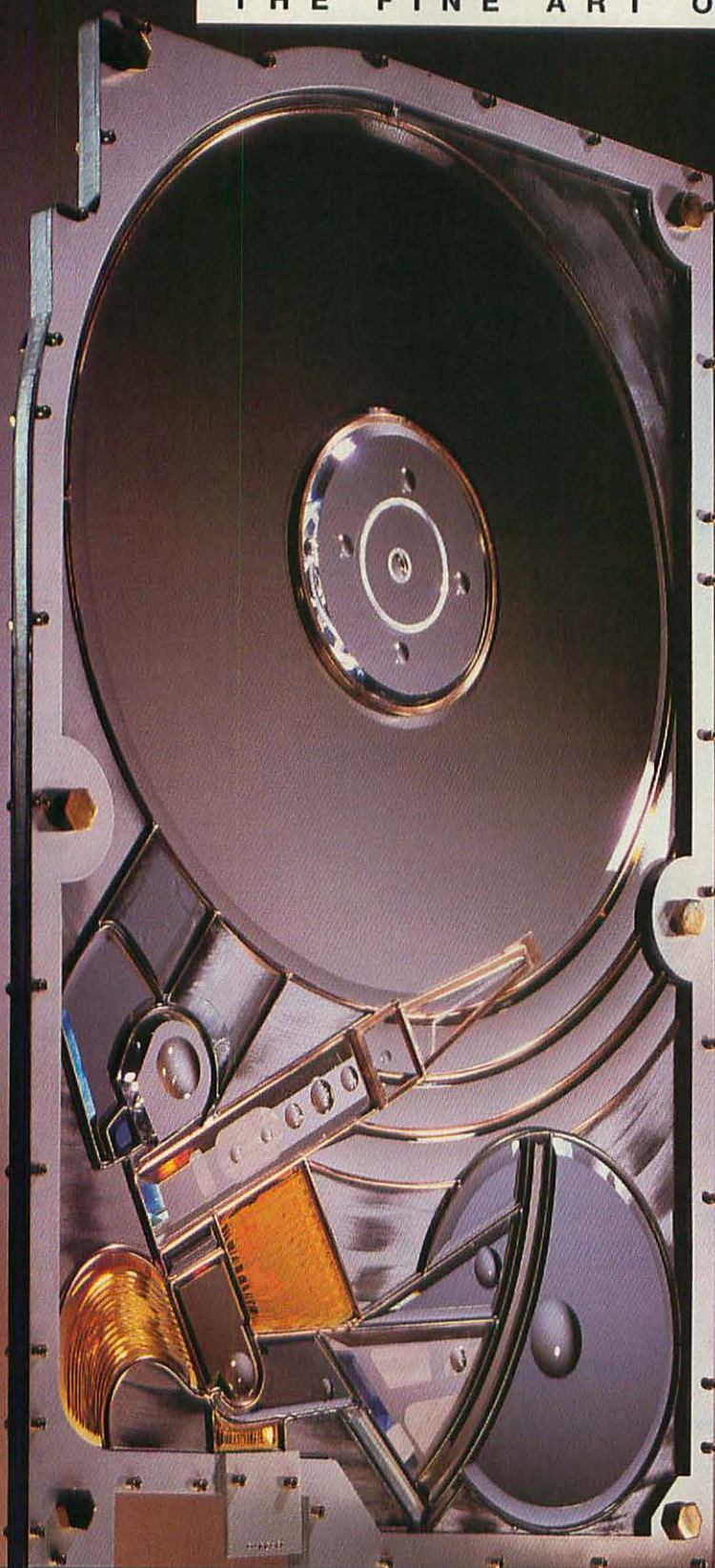
SIMMs (continued)

4M x 8 High Profile .950 inches
4M x 9 High Profile .950 inches
4M x 8 Low Profile .800 inches
4M x 9 Low Profile .800 inches

Their Price	Our Price
NA	\$ 700.00
NA	\$ 750.00
NA	\$1000.00
NA	\$1100.00

*Published prices in Computer Shopper 2/90

THE FINE ART OF DISC DRIVES



*Beveled Glass Window by
Thomas Tisch & Andreas Lehmann
Oakland, California*

Even to the experienced observer, a disc drive is a technological marvel. With discs spinning at 60 revolutions per second, the mechanics involved are astounding. It takes a company with a unique level of skill and experience to produce drives in volume that perform reliably year after year. A company like Seagate.

Our 3.5" ST1096 family is a great example of Seagate craftsmanship. Featuring a choice of 42, 60 or 83 formatted megabytes, these high performance (24 msec average access time) drives are ready for demanding PC and Apple® applications. The family offers ST412/MFM and SCSI interfaces for application flexibility. And they all feature a 50,000 hour mean-time-between-failure rate.

Like the artist who spends years perfecting his craft, Seagate has spent the past decade mastering the fine art of disc drives. For more information on our multi-faceted product line, contact your authorized Seagate distributor, or call Seagate directly at 800-468-DISC, or 408-438-6550.

 **Seagate**

Apple is a registered trademark of Apple Computer, Inc.
Seagate and the Seagate logo are registered trademarks of Seagate Technology, Inc.
© 1989 Seagate Technology, Inc.



MACWORLD NEWS

by Dan Littman and
Tom Moran

Moonraker: Not for Your Eyes Only



Workstation Technologies' Moonraker Video Digitizer is the first real-time, color video digitizer for the Mac II series. It can capture an analog video signal in a variety of broadcast formats and convert it into digital information for manipulation by the computer.

The Moonraker, which consists of one full-size NuBus board, accepts input from any PAL or NTSC video source. In NTSC mode, it offers a resolution of 645 by 484 pixels; when the board's software is set for PAL, its resolution is 768 by 512. The digitizer can create 8-bit color or gray-scale digitized images, 16-bit color images, or 32-bit color images. Its speed varies from 2½ frames per second in 32-bit mode, to 30 frames per second in 8-bit mode for NTSC, and 25 frames per second for PAL in 8-bit mode.

Two RGB inputs, one composite-video input, and one Super VHS input are incorporated in the board. You can attach both a video camera and a videodisc player and do fades and dissolves with the two inputs.

The board also supports scaling and masking of the digitized image. A sophisticated color-mapping technique allows the user to change all pixels of one color to another color, among other functions.

The Moonraker will not be available directly from Workstation Technologies, but will be resold by third-party vendors. For more information on products incorporating the Moonraker digitizer, call the company in Irvine, California, at 714/250-8969.

—Tom Moran



DAVID B. MOORE

With video camera attached, the Moonraker Video Digitizer captures our photographer on screen in real-time, full-motion video.

HyperCard to Translate Medical Babble



Lexical Technology didn't set out to construct the world's largest known HyperCard application, but the company's MetaCard, a comprehensive cross-reference of thousands of phrases from the leading biomedical indexes, has achieved that distinction: it packs more than 106,000 cards into 109 stacks that consume 136MB of disk space. MetaCard is the browser interface to the Metathesaurus, the first milestone of the National Library of Medicine's (NLM) ten-year Unified Medical Language System

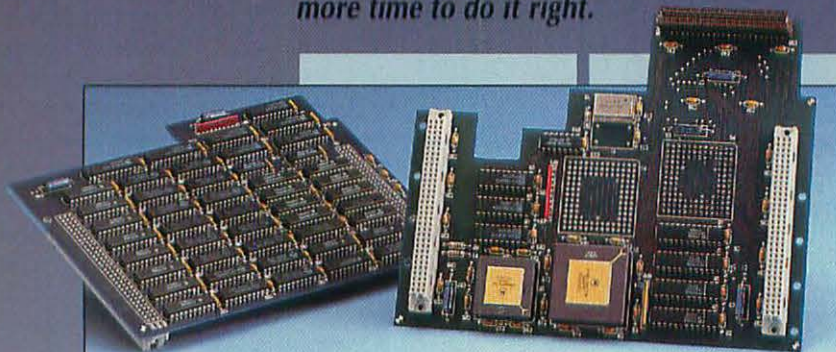
(UMLS) project. The UMLS project is a federal initiative to facilitate retrieval and integration of information from machine-readable sources including journal articles, clinical records, databases such as organ-donor registries, and medical knowledge-bases.

One of MetaCard's primary functions will be to allow physicians to compose natural language queries to the Medline online database. Up to now, Medline searching has suffered from a lack of standard terminology among the indexing systems. For instance, to a physician *atherosclerotic heart disease* and *coronary artery disease* mean virtually the same thing, (continues)

DAYSTAR PRODUCTS...

SPEED, POWER & EXPANDABILITY

DayStar provides Macintosh® professionals with speed to go beyond the ordinary. Whether its graphics, database, accounting or connectivity, our products make projects flow smoother with more time to do it right.



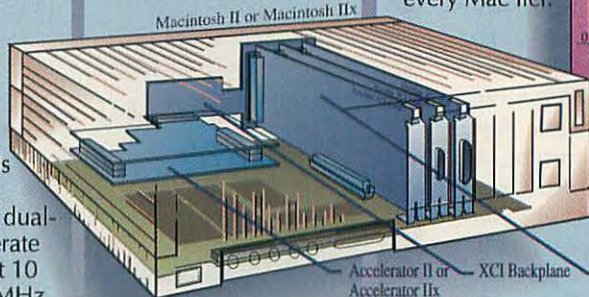
Accelerator II, IIx and IIcx™

DayStar Accelerators put the speed of leading-edge technology into the Macintosh II, IIx and IIcx. They create a professional platform that delivers real gains in productivity. Even the most complicated graphics begin to flow smoothly from one command to the next. Providing time to create more powerful results. Available in 25, 33, 40 and 50 MHz configurations for the Macintosh II, IIx and IIcx.

DayStar Accelerators enable professionals to get more done in less time

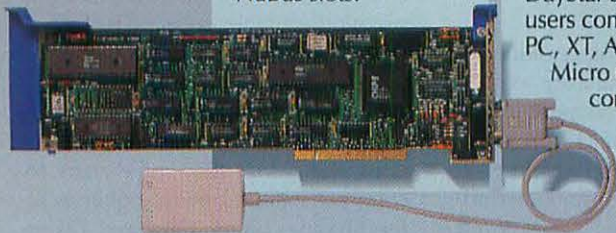
System XCI™

Break the NuBus performance barrier. DayStar's XCI backplane connects XCI cards to every DayStar Accelerator. These dual-ported boards operate through NuBus® at 10 MHz or up to 50 MHz via the XCI backplane. XCI equipped professionals can incorporate superfast RAM, SCSI and 24 bit Video into NuBus slots.



LT200™ LocalTalk Interface Boards...

The transparent PC to LocalTalk connection. DayStar's LT200 lets users connect IBM® PC, XT, AT, PS/2 Micro Channel or compatibles to LocalTalk™ networks.

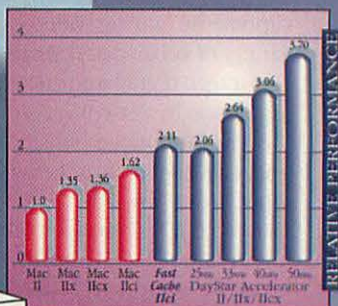


Fast Cache IIci™

The high-performance cache card for Apple's new Mac IIci.

This powerful new cache memory board plugs directly into the Mac IIci's cache connector. Fast Cache IIci boosts processing speed up to 40% by caching the 68030 processor at zero wait-states. That's why Apple® builds a cache connector into every Mac IIci.

Fast Cache IIci increases Mac IIci processing speed up to 40%



DayStar offers a complete line of performance oriented products

Toll-free technical support puts us just a phone call away.

DayStar products are supported by a one year limited warranty.

We stand behind our products with cost effective upgrades that guarantee access to the latest technology.

System XCI is the absolute maximum in Macintosh performance

Call 1-800-962-2077 today for more information and the name of your nearest Authorized DayStar Dealer.



DAYSTAR

D I G I T A L

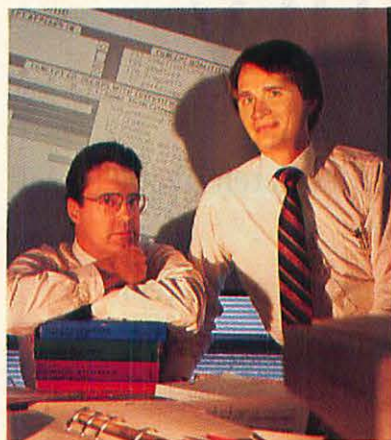
Available exclusively through dealers and value added resellers

5556 Atlanta Highway, Flowery Branch, GA 30542, (404) 967-2077

Other brands and product names are trademarks or registered trademarks of their respective holders. Product specifications are subject to change without notice. ©1989 DayStar Digital, Inc.

Dealers circle 404 on reader service card

End Users circle 477 on reader service card



David Sheretz (left) and Mark Tuttle of Lexical Technology.

but to a computer searching a database by word-matching, there is no overlap. MetaCard creates thousands of conceptual links between such linguistically disparate terms.

MetaCard owes its capabilities to two unique features: a powerful lexical-matching algorithm that automates the cross-referencing process, and a lightning-fast search routine that bypasses HyperCard's cumbersome Find command.

MetaCard will eventually be pressed on CD ROM and updated periodically as medical terminology evolves. It will revolutionize the use of multilayered information systems of telecommunications, databases, and decision-support systems. Physicians will use it for consulting with online expert systems such as AMANet's DXplain, and at hospitals and insurance companies it will access patient records to automate billing. The MetaCard technology can be generalized to any field that uses a vast lexicon of technical terms, such as law, engineering, or insurance underwriting.

For more information contact Lexical Technology in Alameda, California, at 415/865-8500.

—Beverley Kane, M.D.

The Parallax Mac



The 1990 Time Table of Science and Innovation from Xiphias is a CD ROM for the Mac that provides simultaneous glimpses along three time lines: past, present, and future. You view the past

through a variety of multimedia tools that show the dawn of human innovation and let you see what theorists think was hot in recent prehistory.

The disk is organized to provide hypertext linking of related topics by keywords, and each word in a report is hot-linked to the disk's search engine. Choosing the word *China*, for example, produces a list of all stories on the disk about Chinese technology and scientific discovery.

In addition to displaying text, however, the 1990 Time Table of Science and Innovation provides a number of features that further enhance the learning and the fun. Video sequences, composed of digitized video frames that are displayed at a rate of two per second, provide moving pictures of important events. One sequence, for example, shows animations of the space shuttle and of a moon landing. Still graphics, including shots of artwork from major museums and private contributors, also enhance the reports.

An Atlas button brings up maps that show where particular important events occurred. A Zoom button shows the distance from the earth of

ticular event; and a Bibliography button gives citations of sources for each of the more than 6000 stories in the Time Table. Also, you can navigate by selecting specific titles or keywords, by selecting a range of calendar years to search for innovations, or by activating Time Cycles which tie technological innovation to economic cycles.

The 1990 Time Table of Science and Innovation was scheduled to ship in January. Its suggested retail price is \$185, although registered owners of the 1989 version may upgrade for no charge. For more information, call Xiphias in Los Angeles, California, at 213/841-2790.

—Mark Brownstein

The Evolution of Animate Objects



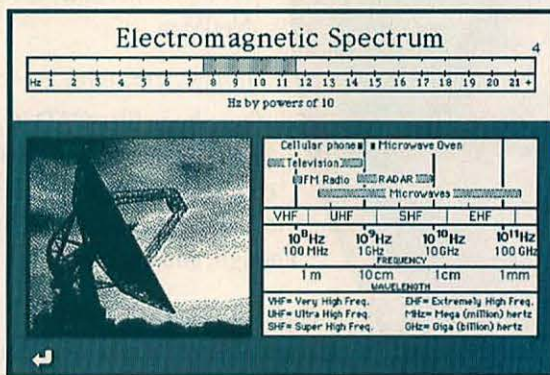
MacroMind's two new products, Director 2.0 and Three-D, boost Macintosh animation another step up the ladder.

Director's Score environment—in which you line up actors, sounds, and other animation parts—will add a channel for scripts written in its new object-oriented language, Lingo, so that Director 2.0 animations can react to input from people or other sources. When people respond to prompts or click on buttons, Lingo scripts will be able to interpret the input and change an animation to match. Lingo can also create windows, menus, and other Mac

interface objects. It provides a wide range of functions, constants, operators, and properties, but as in HyperCard, basic scripting will be accessible to anyone.

MacroMind Three-D is not a 3-D modeling package. It is designed for importing 3-D objects from other packages (including Swivel 3D, Super 3D, MiniCAD, Design Dimensions, and DXF and IGES files) and preparing the objects for use in Director. Three-D can render images or export them to

(continues)



A screen from the 1990 Time Table of Science and Innovation shows the electromagnetic spectrum.

an aerospace event or space discovery by having you visually lift off from the earth and rise to view the planet from the appropriate altitude.

A Frequency button shows the electromagnetic frequency at which types of energy occur; a Geochronology Timeline button shows the evolution of life on earth; a First Person button displays a text field with a witness's first-person account of a par-

"Optical-ability"

Pinnacle Micro is the world's leader in removable, erasable, optical storage systems.

The expanding line of Pinnacle drives offers real solutions to mass storage problems and a whole new set of data handling capabilities.

Removable, Erasable, Opticalabilities.

Access-archivability.

Access your archives quickly and easily. Why wade through stacks of floppies or miles of tape to find a single file?

Platform-compatibility.

Interface kits are available for Macintosh, Sun, DEC, HP, IBM-XT, AT, PS/2 and compatibles, plus advanced applications such as Unix, A/UX, Xenix and Novell NetWare.

Infinite-storability.

Store huge files-CAD/CAM, multi-media, pre-press, 32-bit color. Each cartridge holds up to 650 megabytes. If one isn't enough, add another.

Data-securability.

Carry your world wherever you go. Put your operating system, applications, and data files on a single cartridge. Keep your data safe and secure or move it from place to place.

Interface kits available for MAC, SUN, DEC, HP, IBM A/T, X/T, PS/2 and compatibles from \$495.

Upscale-ability.

Start with a single or dual-disk system for your network today. Move up to a 25 disk, 16 gigabyte system tomorrow. Your cartridges and your data will easily move up with you.

Crash-avoidability.


Eliminate crash anxiety, with laser technology there are no heads to crash. If your hard drive goes down your optical system will put you back on-line immediately.

Mass-movability.

Distribute massive amounts of data in limited quantities. CD-ROM's are great, but not if you need a reduced amount.

Problem-solvability.

Learn how to put these and other opticalabilities to work for you, call today for the name of your nearest authorized dealer.

 (800) 553-7070



Trademark Owners: REO-650, REO-1300 and Pinnacle Micro of Pinnacle Micro, Inc. Sun of Sun Microsystems. HP of Hewlett Packard. A/T, Xenix, IBM, PS/2 of International Business Machines Corporation, Netware of Novell. Macintosh of Apple Computer, Inc.

PINNACLE MICRO

15265 Alton Parkway • Irvine, CA 92718 • In CA (714) 727-3300 • FAX (714) 727-1913

THE ERASABLE OPTICAL STORAGE COMPANY™

Circle 287 on reader service card



A Director 2.0 animation with buttons and open Score window.

renderers such as Pixar and Silicon Graphics machines. MacroMind describes Three-D as a key parameter system, as opposed to the key framing system used by many 3-D packages, because you can edit all parameters—for example, color changes and x-, y-, and z-movement—individually, rather than having to set up and take snapshots of a series of frames.

Three-D will also be able to send rendered animations frame-by-frame to video recorders such as the Diaquest, ARTI, and Lyon-Lamb devices; and using drivers written as Lingo XObjects (similar to HyperCard XCMDs), Director and Three-D will be able to call other devices as well.

Pricing had not been established for either product at press time. For more information, contact MacroMind in San Francisco at 415/442-0200.

—Dan Littman

Making a Higher Resolution



LaserMax Systems, maker of high-resolution laser printers and controllers, has announced a technology that allows the company's printers to achieve 1000-by-1000-dpi resolution. Called TurboRes, the technique can also increase the vertical resolution of other laser printers based on Canon's popular CX or SX engines.

Previously this was thought impossible because both the rate at which the imaging laser draws lines across the page and the speed at which the paper goes through the laser printer are set. However, LaserMax has applied for a patent on a method to selectively increase the height of the dots drawn by the laser on the imaging drum. Because this means that the printer can draw very smooth curves, the effective vertical resolution of the output is increased to 1000 dpi, according to the com-

pany. Before it developed TurboRes, LaserMax had already been producing printers and controllers with 1000-dpi horizontal resolution by doubling the RAM of the printer and increasing the speed with which the laser turns on and off as it marks individual dots. This method results in narrower dots and more of them in the same space.

The resolution that TurboRes adds to various LaserMax printer controllers depends in part on the amount of



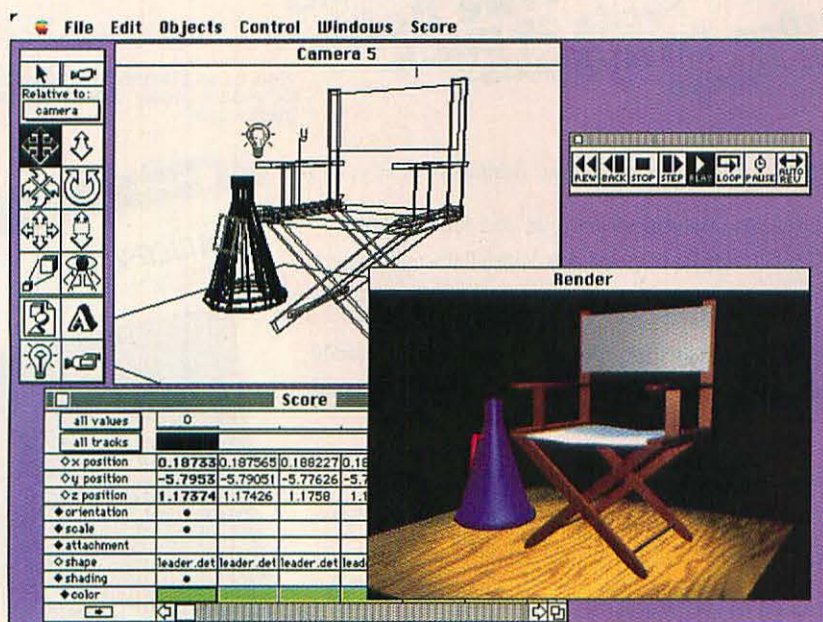
The LaserMax 1000 laser printer controller provides up to 1000-by-1000-dpi output.

RAM the controllers include. With a \$100 software upgrade to TurboRes, LaserMax's MX6/4, MX6/6, and LaserMax 1000 controllers all increase their resolutions; the 4MB MX6/4 to 600 by 600 dpi, the 6MB MX6/6 to 800 by 800, and the 6MB LaserMax 1000 to the full 1000-by-1000-dpi resolution.

The upgrade—which will be free to those who bought the products after November 10, 1989—applies to printers that currently have MX6/4, MX6/6, or LaserMax 1000 controllers. All those controllers shipped after December 15, 1989, will include the new TurboRes capability. The upgrade was slated to be available in January.

The LaserMax 1000 printer has a suggested retail price of \$7995, which includes the controller and software. The printer's controller requires one NuBus slot. For more information, call LaserMax Systems in Eden Prairie, Minnesota, at 612/944-9085.—T.M.

(continues)



In MacroMind Three-D you can assign values to all of an object's attributes, including position and path, and then render the image.

FONT-LOOSE

& fancy-free

Bauhaus Heavy ITC Kabel Ultra Futura Extra Black
 Chen Revue Franklin Gothic Condensed Bodoni Poster
 as Medium MACHINE Folio Extra Bold ITC Kabel Bold
 Bookman Light Linotype Centennial Belwe Bold
 elsior Galliard Roman Melior Italic Serifa 75 Black
 iat Eurostile Oblique Stone Sans Dom Casual Struktur
 Kabel Helvetica Condensed Eras Light Freestyle
 enir Futura Light Bauhaus Sonata
 Memphis Univers 47 Serifa Sonata
 f Chancery University Optima
 iquor Light

Visit us at Macworld Exposition
 Moscone Center, San Francisco
 Booth 2137

What good are all those Fonts and Desk Accessories if using them is a hassle? Suitcase II sets you free!

Suitcase II is the award-winning software that gives you unlimited access to *all* your fonts and desk accessories, all the time. Without having to use Font/DA Mover to install and deinstall them. Without cluttering up your system file. Without anything to stand between you and your creativity.

Imagine being able to view an unlimited number of fonts *in their own typefaces* at any moment, picking and choosing among them without breaking stride. Imagine never having to search through a cluttered System File to find what you need.

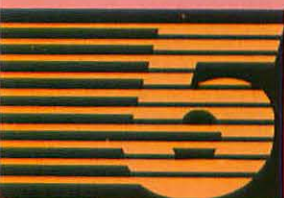
Imagine never having to deal with font ID conflicts, never having to restart your system to install a Desk Accessory you need. Imagine spending your time *creating* instead of juggling fonts and DAs.

Imagine Suitcase II on your Macintosh...

FIFTH GENERATION SYSTEMS

10049 N. Reiger Road Baton Rouge, LA 70809 (504) 291-7221

Circle 364 on reader service card



Macintosh is a trademark of
 Apple Computer, Inc.





Reality Built for Two



In 1970 computer-science professor Myron Krueger sat before a video monitor at the University of Wisconsin watching two hands moving. One hand was his own and the other belonged to his colleague, who was observing the same live video at a screen a mile away. Cameras trained on each man's hand fed video into a single computer, which then composited the input into the one image appearing on both screens. Krueger noticed that when their on-screen hands nearly touched, his colleague pulled away—maintaining masculine propriety even in this artificial reality. Krueger chased his shy colleague's hand all around the screen: "We were already a mile apart," he says, "but he still couldn't get away fast enough."

Krueger has experimented with artificial reality since the 1960s. Since 1974, he has pursued his ideas in an ever-evolving piece called Videoplace, an installation at the Connecticut Museum of Natural History in Storrs, Connecticut. Videoplace visitors in separate rooms can fingerprint together, perform free-fall gymnastics, tickle each other, and have all sorts of fun. The computer combines and alters input from separate cameras trained on each person, who responds in turn to the computer's output, playing games in the worlds Krueger's software creates.

It sounds like science fiction, but Apple's Human Interface Group is interested. Joy Mountford, the group's manager, has loaned Krueger a Mac to integrate into Videoplace's custom hardware and software setup. Krueger plans to apply his "gestural interface"



One person turning cartwheels and another toying with string find their realities combined in Videoplace.

to Mac applications, and to use the Mac's graphics power to improve Videoplace. He thinks someday we'll set aside our mice and put both hands right into the Mac's screen to select with a gesture or draw with our fingers. Krueger envisions human interfaces that we use unawares. In Videoplace, there is nothing to hold or manipulate. You can stand, walk around, and use your whole body, not just your brain and your fingers. As Mountford says, "[Krueger is] pushing intuitive computing beyond the mere graphical interface and into the realm of human gesture, drama, and personality." Imagine thinking, writing, drawing, or designing as fully human, mind-body activities, instead of somatic enslavement to mind and machine.

Krueger's seminal theoretical work, *Artificial Reality* (Addison-Wesley, 1983), will be reissued this summer. For more information, contact Krueger at Artificial Reality, P.O. Box 786, Vernon, Connecticut 06066.

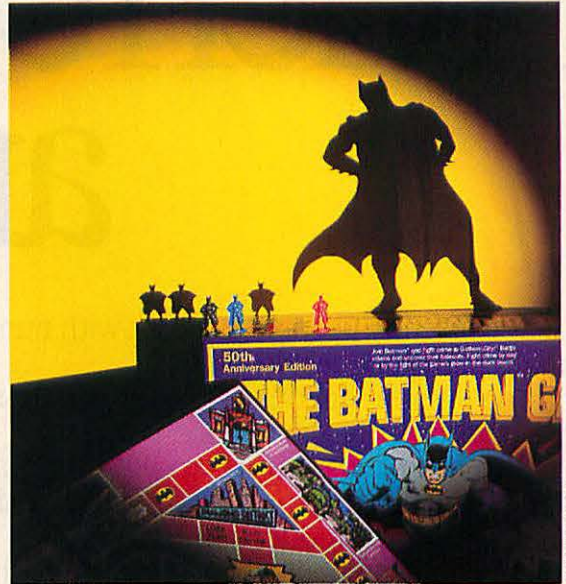
—Ann Garrison

Holy 128K, Batman!



If you think you need a fully loaded, top-of-the-line Mac in order for your business venture to succeed, you might want to think again. At least one company, University Games, of Menlo Park, California, managed to make a success story with nary a Mac II or color monitor in sight. Cris Lehman and Bob Moog of University Games ventured into the board-game market mixing their own brand of strategy and whimsy on no more than an IBM portable, an ImageWriter, and a Mac 128K.

Business has been brisk since the company's inception in 1983, with annual revenues now above the \$5 million mark. Although the computers used have grown too, they still reflect the company's humble beginnings.



PIERRE-VES GAVES

A part of The Batman Game board, designed by University Games on a low-end Mac.

The original 128K is still crunching away, although it's been upgraded to a 512KE with a 20MB hard disk. The company also added a Mac Plus with a 45MB drive and a LaserWriter. The Macs share the LaserWriter with a few IBM PCs via TOPS.

University Games has used the Macs primarily to design instructions and game cards for about twenty games the company has created. The Macs helped in producing the company catalog and in making sketches of game boards during brainstorming sessions. Last year, with the help of MacDraw II, the company designed the entire prototype for the board used in The Batman Game, which has sold more than 350,000 copies.

Batman is the first game for which the company created the final playing board on the Mac. David Andrews, who designed much of the board, said the only drawback was in sizing the pages. He found it difficult to scale the pages so they would correspond with the exact size needed for the board. Hence, there was a lot of cutting and pasting during development.

University Games—the originator of the Murder Mystery Party games—has just come out with a game called Pop Opinion, and has about eight to ten other projects in the works. With the help of Aldus FreeHand, Page-
(continues)

Preferred by nine out of ten accountants and manipulators

Consistently, people who work with numbers have some noticeable traits.

They're intelligent, organized and thorough—buttoned up, if you will.

Which explains why Microsoft® Excel has been the spreadsheet standard for Macintosh® ever since it was introduced in 1985. Today, 90% of Macintosh spreadsheet users do their calculating, manipulating, analyzing and presenting with it.

And while Microsoft Excel has always been easy to learn and use, it can now perform

all the complex functions you perform, but with labor-saving benefits.

You can easily build complex models, and conveniently link multiple sheets with a simple point and click.



So the left hand knows what the right is doing, we've added a feature that will tie your data into Microsoft Word documents. Then update that same data automatically, when

With Microsoft Excel you can create impressive documents, choosing from 256 fonts and colors, variable row height and shading.

Profitability by division

WinMark Copiers

WxC 2000

		JUL	AUG	SEP	OCT	NOV	DEC
Revenue (In Thousands)	Actual	\$8,400	\$12,300	\$13,900	\$8,700	\$13,000	\$21,300
	Forecast	\$6,453	\$8,800	\$10,050	\$9,460	\$12,000	\$18,900
	Variance	\$1,947	\$3,500	\$3,850	(\$760)	\$1,000	\$2,400
	%	130%	140%	138%	92%	108%	113%
Cost of Goods Sold	Actual	\$1,848	\$3,198	\$3,475	\$2,262	\$2,860	\$7,663
	Forecast	\$1,549	\$2,288	\$2,312	\$1,608	\$2,640	\$3,969
	Variance	\$299	\$910	\$1,164	\$654	\$220	(\$3,969)
	%	119%	140%	150%	141%	108%	0%
Gross Profit		\$6,552	\$9,102	\$10,425	\$6,438	\$10,140	\$21,300

WxC 1000

		JUL	AUG	SEP	OCT	NOV	DEC
Revenue (In Thousands)	Actual	\$2,184	\$3,198	\$3,892	\$2,610	\$4,030	\$5,325
	Forecast	\$1,613	\$2,200	\$2,513	\$2,365	\$3,000	\$4,725
	Variance	\$571	\$998	\$1,380	\$245	\$1,030	\$600
	%	135%	145%	155%	110%	134%	118%

ut of ten calculating lative people.

it's been changed in Microsoft Excel.

To insure data integrity, we've even built in alerts that will warn you of such grievous errors as circular references. In fact, Microsoft Excel is so bright, it will actually review your worksheet and flag any formulas that don't fit an established pattern.

Furthermore, the search and replace function can make corrections on a global scale. And customized number formatting lets you bend the rules, allowing you to create everything from a 3-digit account code to a 17-digit part number.

Now, we've left a lot out in this short discourse, but Microsoft Excel hasn't. So be sure to ask your dealer for a complete explanation of its capabilities. And you'll see how Microsoft Excel will make your job easier and better.

Or, if you look at it a different way, you'll become a more effective manipulator. And a more efficient calculator.

Microsoft
Making it all make sense

Then you can Paste Link those worksheets and charts into your Microsoft Word documents and update them automatically.

WinMark Copiers

MEMO:

TO: Shannon Pitts

FR: Peter Cohen

DT: November 13th, 1989

RE: Presentation to the Board

In preparation for the annual meeting, I've created a 20-minute slide presentation on our successful entry into the small printer market.

The presentation will explain to the shareholders that, on a basis of sound marketing strategy, reinforced with our knowledge of the printer business at other levels, we have been able to grow from a 2 percent share of market, to 9 percent in 18 short months.

To the right is an excerpt of the presentation which illustrates our growth. Anticipated concerns will probably center around quality of service and the ability to meet market demand over the next year.

We should be able to squelch any fears by explaining that our small printers have a very low (4%) field repair call requirement at present.

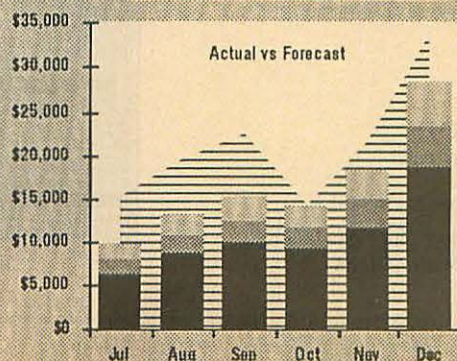
And our assembly resources here in the

WxC 2000

	JUL	AUG	SEP
Revenue (In Thousands)			
Actual	\$8,400	\$12,300	\$13,900
Forecast	\$6,453	\$8,800	\$10,050
Variance	\$1,947	\$3,500	\$3,850
%	130%	140%	138%

With a very respectable 9 percent share after only 18 months, we feel we can reach 15 percent by the end of the next fiscal year (see six month projection).

FY90 REVENUE



New Forms of Business.

Paperwork. The essential inconvenience.

Whether it's invoices, travel expenses, office memos or tax returns, Informed™ software and Macintosh® computers can help you change mountains of paperwork into well-organized forms of information.

It's a new way to draw, fill out and manage forms.

Design and Draw. Informed Designer™ comes packed with high performance drawing features. All to help you draw crisp, professional looking forms in no time at all.

Grids, guides, rulers, tables, fields, combs, lines, ovals, rectangles, arcs, polygons, type — plus a whole lot more. With over 1/1000th of an inch accuracy.

Draw or scan.

Make revisions in minutes. No more obsolete forms.

No. 6 7 - 1 3 - 2 9 4

Draw combed fields or sophisticated tables as easy as drawing a box.

Fill Out. With Informed Manager™, filling out forms becomes an effortless, error free task.

Add intelligence to your forms so they can think for themselves. Eliminate repetitive typing with powerful calculations, choices and automatic lookups. Create customized on-line help to answer common questions.

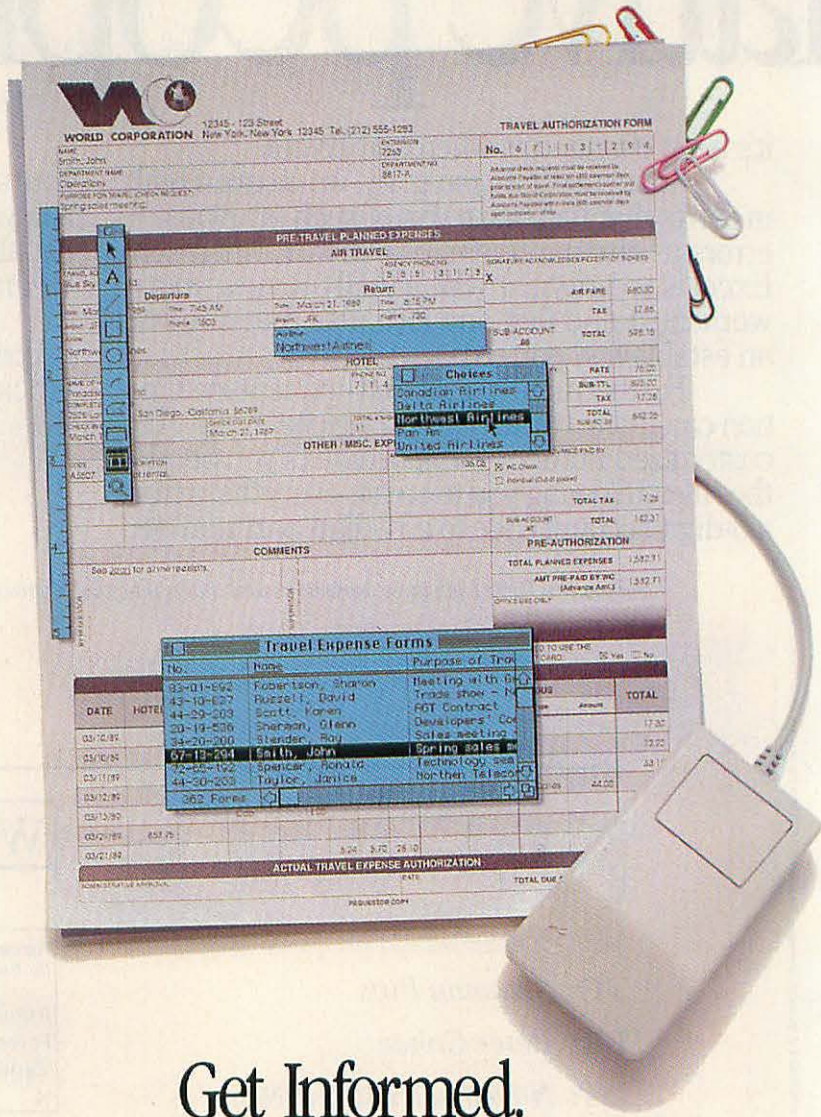
Just imagine the results. Assured accuracy on picture perfect forms.

Store, Sort, Search, Retrieve. Since Informed Manager is actually a database, you can organize and manipulate forms like never before. Search and sort at blinding speeds. Print single forms or group them for batch printing.

And because forms are stored electronically, you print less. The bottom line is less paper, less cost.

So it's time to think about forms the new way. Just give us a call. We'd be happy to tell you more.

Then form your own conclusion.



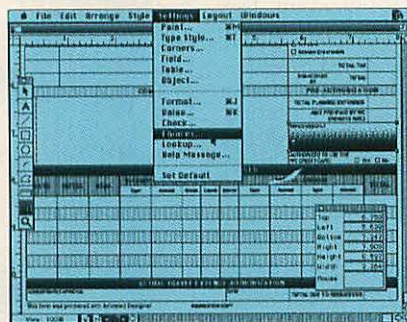
Get Informed.

Informed™
Forms Design and Management

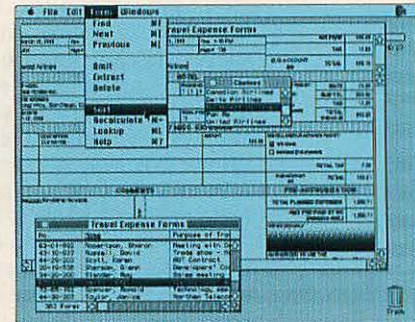
For more information, please call or write:

Shana Corporation
Advanced Technology Center
105, 9650 - 20 Avenue
Edmonton, Alberta Canada T6N 1G1

Tel. (403) 463 - 3330 FAX (403) 428 - 5376
AppleLink CDA0004 MacNet SHANA



Informed Designer



Informed Manager

Copyright © 1989 Shana Corporation. Informed, Informed Designer and Informed Manager are trademarks of Shana Corporation. Macintosh is a registered trademark of Apple Computer, Inc.

See us at Macworld Expo, Moscone #1920

Circle 297 on reader service card



Maker, and Adobe Illustrator—the software programs they primarily use—they will be working their Plus and 512KE without rest for quite a while.

Do they see the need for a higher-end machine soon? CEO Cris Lehman says they don't have a pressing need for color yet, but as the company grows, so will the size Mac he buys. The next purchase, he says, will probably be an SE.

University Games can be reached at 415/322-3953.

—Mary Margaret Lewis

High-Speed Communication to Remote Macs



Engage Communication has begun shipping SyncRouter, a synchronous AppleTalk network router that connects to remote networks via high-speed communications services. SyncRouter includes Chooser-level software that lets you select printers, file servers, and other devices in the remote location. Previous routers were designed for use with Ethernet, which meant that Lo-

calTalk networks required one gateway to Ethernet and another gateway from Ethernet to the communications services.

SyncRouter comes with three I/O interfaces, an RS-232C port, an RS-449 port, and a V.35 connector. Any one of the interfaces can be used to connect to the supported communications paths, which include T1, Digital Data Service, fiber-optic lines, and satellite links.

The router will also be compatible with ISDN (Integrated Services Digital Network) in the near future, according to Engage Communication. SyncRouter currently supports bidirectional data-transfer rates ranging from 54 kilobits per second to 1.544MB per second, depending on the carrier.

Because SyncRouter supports AppleTalk Phase 2, it can access a practically unlimited number of nodes at the remote location. It automatically maps the devices in the various zones and displays them at the Chooser level.

SyncRouter is available now from Engage Communication for \$1895. For more information, call the company in Foster City, California, at 415/358-0264.—T.M.

Object-Oriented CAD Communicates



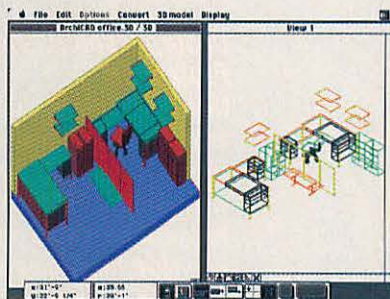
Architects can now use two Macintosh CAD programs together to design everything from floor plans to ceiling fixtures, thanks to a link between the programs that is more intelligent than the IGES and DXF standards.

ArchiCAD, a 2-D and 3-D architectural modeling application from Graphisoft USA, can now be launched by Application User Commands (AUC), the object-oriented programming language underlying the generic drafting and design program MicroStation from Intergraph. Architects can use ArchiCAD's architectural drawing tools to design a floor plan, then use MicroStation's industrial design tools for details like plumbing, wiring, and even ceiling fixtures.

ArchiCAD can access MicroStation's preprogrammed object-oriented routines to manipulate graphics. Keith Bentley, president of Bentley Systems,

which developed MicroStation for Intergraph, says, "When you use IGES, it's time-consuming and information always gets lost in the [translation] process. ArchiCAD and MicroStation are communicating directly, resulting in more complete information being transferred between applications."

To send the dimensions for a wall,



The same office, modeled and shaded in ArchiCAD (left) and as a mechanical design in MicroStation.

for example, from one CAD program to another traditionally, you would first send the dimensions to a DXF or IGES translator, and then transfer them to the second program. These translators are geometric rather than object oriented, so by the time the wall reaches the second program, it is no longer a wall, with its sheathing, finish, and other qualities, but only a set of lines and unrelated characteristics. Those relationships have to be reestablished, which wastes time and leaves room for errors.

ArchiCAD and MicroStation can run together under MultiFinder with 5MB of memory, but 8MB is recommended. MicroStation lists for \$3300, and ArchiCAD for \$3950. For more information, contact Intergraph in Huntsville, Alabama, at 205/730-2000 and Graphisoft in South San Francisco, California, at 415/266-8720.

—Karen Sperling

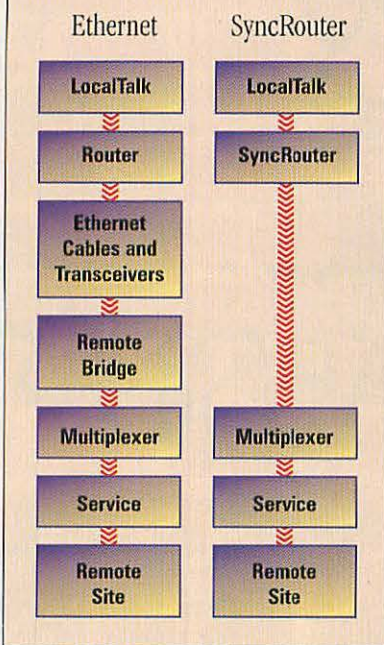
The Tour Guide Inside



Agents—tiny digital people inside your computer who pop up here and there to take orders or make suggestions—have lived in visionaries' dreams for years. Now programmers are catching up with the dreamers.

(continues)

LINKING REMOTE APPLE TALK NETWORKS



SyncRouter eliminates the Ethernet step in communicating between remote AppleTalk networks.

INTRODUCING NEW DISKLOCK

Unbreakable password protection for the Macintosh

It's sad but true. All it takes is a few minutes with your back turned, and an intruder could walk away with your most confidential data. *And you'd never even know it!*

Unsurpassed Password Protection

Now the leader in hard disk security announces the ultimate data protection system for your Macintosh. **DiskLock** works with any SCSI hard disk to provide foolproof password protection for individual files, folders, or your entire hard disk. You can even protect *all three levels* with different passwords for absolute maximum security. **DiskLock** automatically locks your files when you shut down or leave your Mac unattended, and alerts you to any unauthorized access attempts.

Sophisticated Data Encryption

State-of-the-art data encryption adds yet another layer of security. Without the proper password, your confidential files appear to contain nothing but gobbledygook!

Multiple Security Levels.

DiskLock lets you give each user password access to *just the files you choose* (word processing files for your secretary, accounting files for your bookkeeper, etc.). The *master* password gives you access to all files and folders.

Virus Protection, too!

If **DiskLock's** automatic virus checker detects an infection when you log in to a file, it notifies you and stops running immediately.

Visit us at Macworld Exposition
Moscone Center, San Francisco
Booth 2137



STRICTLY
NO
TRESPASSING

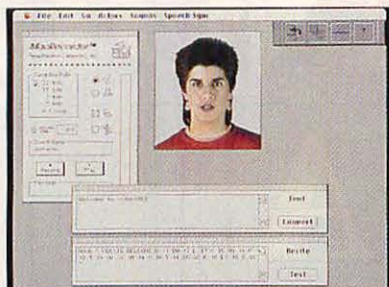


FIFTH GENERATION SYSTEMS

10049 N. Reiger Road Baton Rouge, LA 70809 (504) 291-7221

For a complete list of features and specifications, or the name of your nearest dealer, call 1-800-873-4384.

Circle 250 on reader service card



Synchronizing a talking agent's facial movements to a woman's voice as MacRecorder captures her speech.

Bright Star Technology has published several HyperCard-based products for teaching languages and for building primitive talking agents, or *actors*, by generating speech from written language and coordinating speech with animated faces. Its most recent product, *interFACE*, is a compiled application, free of HyperCard's limitations. Bright Star's technology matches a universal phonetic language with facial expressions, though *interFACE* still must use Apple's robotic-sounding and phonetically nonstandard MacinTalk for its voice.

interFACE has many capabilities the earlier HyperAnimator lacked: actors can have 120 facial expressions, can be any size, and can appear in color, even in HyperCard stacks; a co-articulation capability lets actors change facial expression when pronouncing a phoneme altered by surrounding phonemes; multiple actors can appear at one time and quickly trade off speaking. With Bright Star's list of essential phonemes and a digitizing camera, you could even build a complete actor of your own face.

The RAVEL language has been expanded from 7 to 37 commands. The additional 30 commands enable you to assign agents to specific windows or applications; call the RAVE driver from any environment that supports outside calls (including C and Pascal, making it possible to code agents right into compiled applications); and make agents adapt to different Mac configurations.

Computers are only machines, but it may not be long before they'll have us fooled. Bright Star's products are moving on two parallel tracks: improving computing's human interface by making it sound more human; and

making speech synthesis good enough that people will use it. In fact, Bright Star may release the underlying language- and machine-independent engine, in hopes of establishing a speech-synthesis standard that would be equivalent to PostScript's position in the printer market.

interFACE will list for \$499.95. For more information, contact Bright Star Technology in Bellevue, Washington, at 206/451-3697. —D.L.

For a Faster SE with a Second Monitor



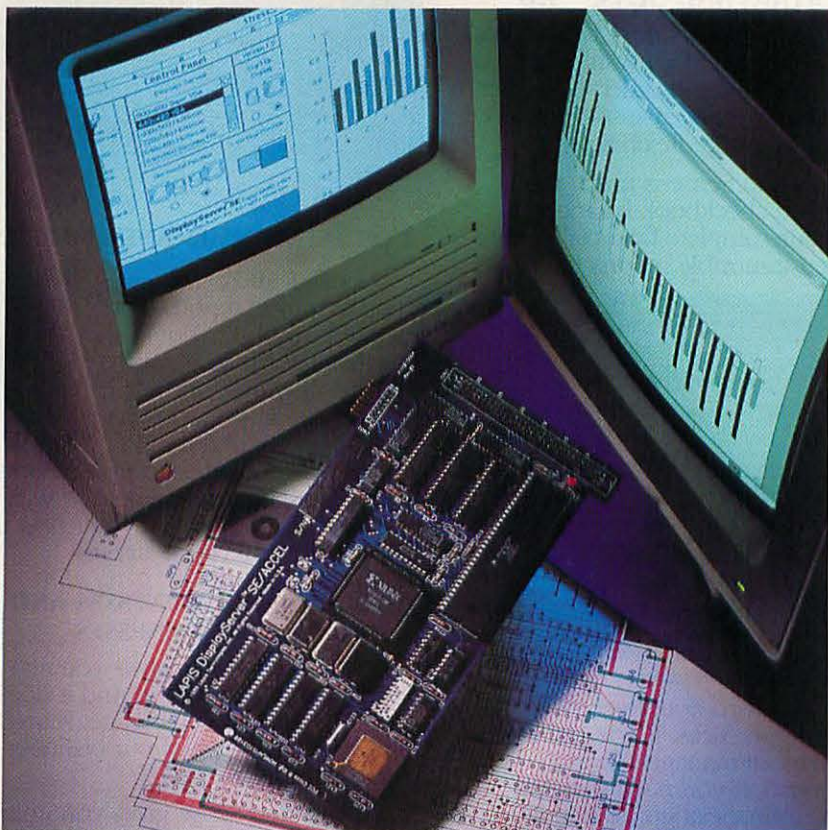
Lapis Technologies has introduced a multifunction add-in board for the SE that accelerates the system and supports a second display. Like Lapis's first products—the DisplayServer SE and DisplayServer II—the DisplayServer SE/XL supports an external Mac monitor or a non-Mac monitor such as a TTL, VGA, EGA, or multisyncing display. The DisplayServer SE/XL adds a 16MHz 68000 microprocessor that ac-

celerates the system, and both the acceleration and display functions reside on a single, standard SE board. The board does not provide color display.

Although speed increases will vary depending on the application, the 16MHz clock rate of the board's processor is twice that of the standard SE system board. The DisplayServer SE/XL also includes a socket for an optional 16MHz 68881 math coprocessor, which is sold by third parties.

The main advantage of supporting a non-Mac monitor is that monitors from the IBM PC world tend to be much less expensive than their Mac counterparts. Also, companies that have been replacing their PCs with Macs, or their monochrome displays with color devices, can now recycle the old monitors as inexpensive second displays for the Mac. The company recommends dealer installation of the device, but says that the process is about as difficult as adding SIMMs.

The list price for the DisplayServer SE/XL was not finalized at press time, (*continues*)



Lapis Technologies' DisplayServer SE/XL combination board accelerates the SE and supports an external non-Mac or Mac monitor.

LUIS DELGADO

LIKE IT OR NOT, YOU'RE A SMALL BUSINESS.

You have income. You pay invoices. You have assets, liabilities and net worth. You show a profit or loss each month. You try to save for major expenses. And you pay taxes.

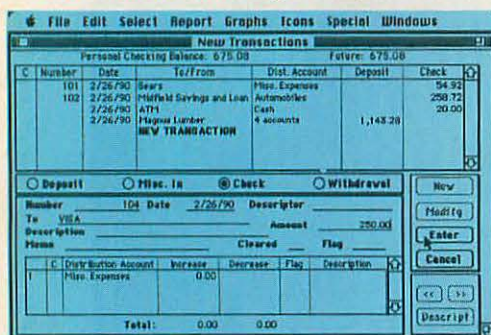
Just like a business.

So why not use the same powerful financial management tool more than 100,000 small businesses (and over 200,000 individuals) use?

INTRODUCING DOLLARS AND SENSE® 5.0

For nearly 5 years now, Dollars and Sense has helped Macintosh® users get their financial lives in order. Now, version 5.0 brings new ease-of-use features and still more flexibility.

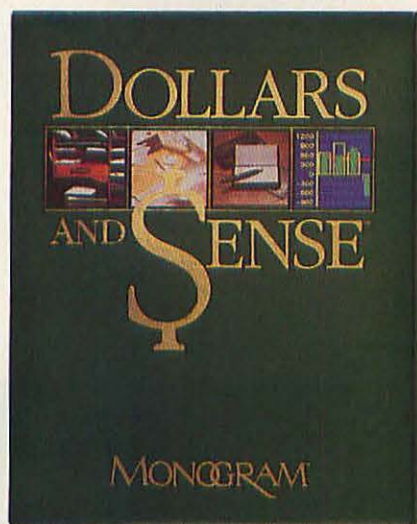
Dollars and Sense is much more than a mere checkbook balancer. It shows your complete financial picture—with customizable reports based on



Version 5.0 puts a friendlier face on the powerful business-capable financial planning program that became the industry standard.

industry-standard double-entry accounting practices. It acts like a personal financial manager, giving you the information you need to help attain your financial goals. And it requires no accounting knowledge.

You may upgrade to Dollars and Sense 5.0 from any commercially available financial management program. Simply send the cover of your manual along with \$59.95 (and any applicable sales tax) plus \$6 shipping and handling to Monogram at the address at right. Offer expires April 30 1990. Registered users of any version of Dollars and Sense for the Macintosh may upgrade to version 5.0 for \$34.95 plus applicable tax, and \$6 shipping and handling.



FOR INDIVIDUALS AND FAMILIES

Dollars and Sense gives you graphical reports that show how you're doing against the budgets you've set. Its new interface lets you create custom reports you can save and recall as icons. It provides you with start up accounts for real estate management as well as personal finance. It even lets you design custom check layouts.



FOR SMALL BUSINESSES AND HOME BUSINESSES

Dollars and Sense gives you real double-entry accounting. And it does it 'invisibly.' In fact, you can get started right away with one of our business start-up accounts.

Dollars and Sense gives you unlimited transactions and up to 9,999

FEATURE COMPARISON

	Dollars and Sense	Quicken	MYM Mac
Prints checks	Yes	Yes	Yes
Pays bills automatically	Yes	Yes	Yes
Tracks income & expenses	Yes	Yes	Yes
Tracks assets, liabilities, equity	Yes	No	Yes
Full financial statements	Yes	No	Yes
Reports in graphic formats	Yes	No	Yes
Multiple checkbooks	Yes	No	No
Flexible custom reporting	Yes	No	No
Sub account levels	8	0	3
Easy to correct mistakes	Yes	No	No
Password security	Yes	No	No
Suggested list price	\$149.95	\$59.95	\$219.95

accounts. You can have multiple transaction accounts (like checks and credit cards) within a single file. And sub-accounts so that you can more precisely track income, expenses, assets and liabilities. And you won't waste time and effort, because unlike other financial programs, Dollars and Sense can export your account data to full-fledged business accounting programs.

**OUR SMALL
BUSINESS PROPOSITION:
Upgrade from other
financial programs for just
\$59.95!**

To introduce more people to the power of Dollars and Sense, we have a special limited-time offer: we'll allow you \$90 credit for any competing program you now own (see details below) when you trade up to Dollars and Sense 5.0.

This offer expires April 30, 1990. So think it over. But think fast. We're sure you'll make a businesslike decision.

MONOGRAM
21821 Plummer St., Chatsworth, CA 91311
(818) 700-6200 Fax: (818) 700-6220

CompuServe®: 76701,113
©1990 Monogram Software, Inc.



but the company predicted it would be between \$650 and \$750. The board was scheduled to ship by the end of February. For more information, contact Lapis Technologies in Alameda, California, at 415/748-1600.—T.M.

John Hancock Goes Mac

X Looking for the ultimate virus protector? Can't run a paperless office because too many documents need signing? Take a look at RSA Data Security's digital fingerprinting product.

RSASign and RSACheck are based on cryptographic technology developed at MIT in the late 1970s. Under this system, you have two keys—a public key, with which other users encrypt messages for you, and a private key you use to decrypt messages that have been encrypted with your public key.

Rather than encrypt data, RSASign and RSACheck verify the authenticity and integrity of documents by attaching an encrypted digital "signature" or "fingerprint." RSASign distills the contents of a file into a 16-byte digital fingerprint, which it then encrypts and inserts in that document as a resource. When the receiving party decrypts the signature, if even a single bit in the file has been altered—by tampering, by a virus, or even due to a disk-write

error—the two fingerprints won't match. Because only the tiny signatures are encrypted, signing and verifying files takes just a few milliseconds, and files can be processed in batches.

RSASign and RSACheck are most useful where data integrity or authorship is as important as secrecy. For example, when faced with managing the many versions of software they are developing, the programmers at RSA use RSASign to lock down a version and its documentation. RSA's technology can also be incorporated into other products—for example, Lotus uses the IBM PC version in its Lotus Notes, a groupware editing product.

A single copy of RSASign and RSACheck lists for \$195; site licenses and server versions are much less expensive. For more information, contact RSA Data Security in Redwood City, California, at 415/595-8782.

—Macworld Staff

Physics On Screen



Mechanical physics is essentially the study of forces that put matter in motion, change its course, or stop it from moving. Physics students learn about motion by description, first anecdotal and then mathematical, but even using such common teaching tools as wave tanks, time-lapse films of bouncing ping-pong

balls, and 50-foot slinkies, the concepts are difficult to grasp.

Interactive Physics teaches mechanics by giving you control of a world. You build an environment using rectangles, circles, and polygons, then tie them together with anchor points, springs, ropes, and shock absorbers, and set it all in motion. You control the density, mass, and initial

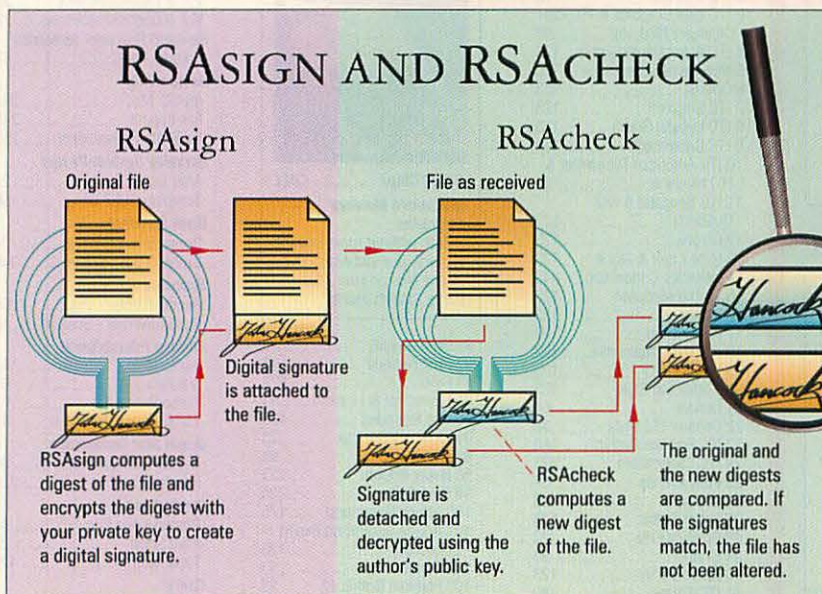


Professor John Ertel teaches mechanical physics to future navy officers.

velocity of each object; the tension of springs and shock absorbers; and even gravity and air resistance. A few lines moving about in a two-dimensional plane appear realistic because they are governed by the same math that describes motion in the real world—in fact, the sample file of a car and passenger crashing into a wall will undoubtedly make you cringe.

John Ertel teaches physics to two dozen second-year students at the U.S. Naval Academy, in Annapolis, Maryland, aided by Interactive Physics on a 37-inch Mitsubishi monitor. He says, "There are things you can do with Interactive Physics that you can't do in a lab—for example, slow down time as an action progresses." He doesn't know yet if test scores will improve, but students "can set up a problem and get a mental picture of it [which makes it] a whole lot easier to . . . understand the mathematics." Ertel adds that because Interactive Physics is mechanically oriented it is unsuited for teaching about sound, heat, and electromagnetism.

Interactive Physics lists for \$449. It runs on a Macintosh Plus or SE, but its performance is greatly enhanced by the math coprocessor in the SE/30 and II-family machines. For further information, contact Knowledge Revolution in San Francisco, California, at 415/377-1940.—D.L.



To authenticate documents, RSASign and RSACheck reverse the standard method of using a public key to encrypt data and a private key to decrypt it.

Complete solutions for SOFTWARE 1-800-248-0800

Where savings are huge and advice is free.

The Mac Zone

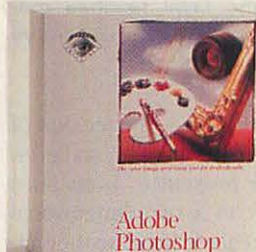
Get the inside story on hard drives - page 3



1stAid Software, Inc.

A package no hard disk user should be without. Includes 1stAid Kit (complete Mac troubleshooting, including file & disk recovery), Complete Undelete (ultimate utility for recovering trashed files), and Sector Collector (safeguards data on hard disks by isolating bad sectors).

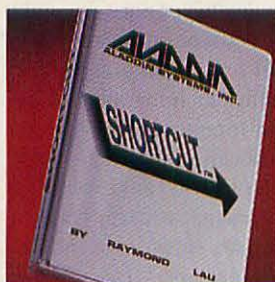
Deluxe 1stAid Kit \$116.



Adobe Systems

Extraordinary new color tool allows you to design with photographs, illustrations & text all in one powerful program. Starting from a scanned in color or black & white photo, create professional quality changes (and even color corrections!) right on your Macintosh screen.

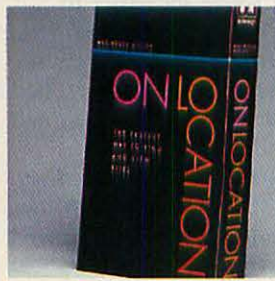
Photoshop CALL



Aladdin Systems

Leap to folders and files, find lost files, save files in new folders decompress Stuffit files, and much, much more. With SHORTCUT and Stuffit, you can literally increase your hard drive capacity from 50% to 75%. Written by Raymond Lau, author of the ever popular Stuffit.

SHORTCUT \$46.



ON Technology

This DA is the fastest way to find & view files. Find a file by typing words it contains or any part of its name. Instantly view the file, including original fonts & styles for word processing documents. Copy text or launch the file directly into its application. Also move, copy, rename, and delete files.

On Location CALL

SOFTWARE

1st Aid Software

Complete Undelete 36.
Deluxe 1st Aid Kit 116.
Sector Collector 36.

3g Graphics

Images w/Impact

Accents & Borders 1 64.
Business 1 64.
Graphics & Symbols 1 49.



MacInTax Federal \$64.

Softview

The complete, easy-to-use tax program for your Mac system. Be sure to ask about InstaFund (your IRS refund in three days!).

A Lasting Impression

Resumé Expert 38.

Aatrix

CheckWriter II 32.
Payroll 3.5 109.
Payroll Plus 173.
TimeCard 116.
TimeMinder 2.1 179.

Abbott Systems

CanOpener 1.0 64.

ACIUS

4th Dimension 2.0 465.

Addison Wesley

Programmers Online
Companion 2.1 32.

Adobe

ATM Plus Pack 109.
Illustrator 88 278.
Streamline 228.
True Form 220.
Type Manager 56.
Typeset I or II 60.

Adobe Postscript Fonts

1 Palatino 123.
2 ITC Bookman 123.
3 ITC Zapf Dingbats & ITC Zapf
Chancery Med. Ital 92.
4 ITC Avant Garde Gothic 123.
5 New Cent. Schoolbook 123.
6 Optima 123.
7 ITC Souvenir 123.
8 ITC Lubalin Graph 123.
9 ITC Garamond 123.
10 ITC American Typewriter &
ITC Machine 93.
11 ITC Benguiat & Friz
Quadrata 123.
12 Glypha 123.
13 Helv. Light & Black 123.
14 Helvetica Condensed 243.
15 Trump Medieval 123.
16 Mellor 123.
17 ITC Galliard 123.
18 ITC New Baskerville 123.
19 ITC Korinna 123.
20 Goudy Old Style 123.
21 Sonata 61.
22 Century Old Style 93.
23 ITC Franklin Gothic 180.
24 ITC Cheltenham 123.
25 Park Avenue 61.
26 Bodoni 123.
27 Letter Gothic 123.
28 Prestige Elite 123.
29 Orator 93.
30 News Gothic 123.
31 ITC Tiffany 180.
32 Cooper Black 93.
33 Stencil, Hobo &
Brushscript 93.
34 Aachen, Revue, Univ. Roman
& Freestyle Scr. 123.
35 Carta 61.
36 Lucida 123.
37 Univers 243.

38 Univers Condensed 180.
39 Futura Light 180.
40 Stone Serif 180.
41 Stone Sans Serif 180.
42 Stone Informal 180.
43 Corona 93.
44 Eurostile 180.
45 Excelsior 93.
46 Futura 180.
47 Futura Condensed 243.
48 Lucida Sans 123.
49 Memphis 243.
50 Helvetica Compressed 93.
51 Italia 93.
52 Belve 123.
53 Caslon 3, Caslon 540 123.
54 Goudy Ex Bold & Heavy 93.
55 Janson Text 55, Janson
Text 75 123.
56 ITC Eras 180.
57 ITC Kabel 123.
58 OCR-A, OCR-B, MICR 93.
59 Helvetica 1 123.
60 Helvetica 2 180.
61 Helvetica 3 180.
62 Times Ten 123.
63 Kaufman 93.
64 Clarendon 93.
65 Peignot 93.
66 New Caledonia 243.
67 ITC Clearface 243.
68 Americana 123.
69 ITC Serif Gothic 180.
70 Century Expanded 93.
71 Serifa 178.
72 Caslon Open Face 61.
73 Frutiger 235.
74 Linotype Centennial 239.
75 Stempel Garamond 123.
76 Weiss 123.
77 Garamond 3 123.
78 Univ. News, Commercial Pi
Univ. Greek & Math Pi 93.
79 Avenir 1 175.
80 Avenir 2 175.
81 Walbaum 123.
82 Antique Olive 123.
83 Life 93.
84 Concorde 123.
85 Gothic 13 & Tempo 93.
86 Cochon 123.
87 ITC Bauhaus 123.
88 Sabon 123.
89 Hiroshige 235.
90 A. Bocklin, F. Fraktur,
Present Scr. & Helv I 123.

111 Bauer Bodoni II 123.
112 Meriden 175.
113 Copperplate Gothic 243.
114 ITC Novarese 175.
115 Künstler Script 93.
116 Industria CALL
117 ITC Souvenir II 123.
118 Bodoni II 123.
119 Russell Square 93.
120 Charlemagne/Trajan 123.
121 Lithos 123.
122 Cottonwood/Ponderosa
Ironwood/Mesquite/Juniper
..... 123.

Advanced Software

DocuComp 87.

AEC Management Systems

AEC Information Mgr 409.
FastTrack Schedule 110.

Affinity Microsystems

Tempo II 74.

Aladdin Systems

Shortcut 46.

Aldus

Freehand 2.02 338.
PageMaker 3.02 384.
PageMaker Color Ext. 149.
Persuasion 2.0 335.

ALSoft

DiskExpress II 55.
Master Juggler 49.
MultiDisk 41.

Altisys

FONtastic Plus 51.
Fontographer 3.0 249.

Antic Software

Business Forms - PageMaker
Vol. 1 Human Resources 27.
Vol. 2 Inventory/Stock 27.
Vol. 3 Operations/Admin. 27.
Flexform Business Templates
Volume I or II 47.

Ashton-Tate

dBASE Mac 294.
Full Impact 248.
FullWrite Professional 255.

Berkeley System Design

After Dark 24.
Stepping Out 2.01 50.

Blyth Software

Omnis 5 Incrementer 74.
Omnis 5 Single User 345.

Bootware Software

ResuméWriter - Pro 58.
ResuméWriter - Student 18.

Borland International

Reflex Plus 188.
SideKick 2.0 67.
Turbo Pascal 1.1 67.
Turbo Pascal Tutor 1.0 49.

Bright Star Technology

Hyper Animator 1.5 98.
Interface 229.

Brøderbund

PosterMaker Plus 34.
Print Shop 35.
TypeStyler 128.

Caere

OmniPage 2.0 549.

Casady & Greene

AME 1-10 Users 978.
AME 1-5 Users 584.
AME Single User 179.
QuickDEX 31.

110 Nuptial/Cascade/Medici
..... 93.



Image Grabber \$31.

Sebastian Software

You can grab just about ANYTHING...desktop icons, full screen shots, color images, pull down menus, dialogue boxes, etc.

111 Bauer Bodoni II 123.

112 Meriden 175.

113 Copperplate Gothic 243.

114 ITC Novarese 175.

115 Künstler Script 93.

116 Industria CALL

117 ITC Souvenir II 123.

118 Bodoni II 123.

119 Russell Square 93.

120 Charlemagne/Trajan 123.

121 Lithos 123.

122 Cottonwood/Ponderosa
Ironwood/Mesquite/Juniper
..... 123.

Advanced Software

DocuComp 87.

AEC Management Systems

AEC Information Mgr 409.

FastTrack Schedule 110.

Affinity Microsystems

Tempo II 74.

Aladdin Systems

Shortcut 46.

Aldus

Freehand 2.02 338.

PageMaker 3.02 384.

PageMaker Color Ext. 149.

Persuasion 2.0 335.

ALSoft

DiskExpress II 55.

Master Juggler 49.

MultiDisk 41.

Altisys

FONtastic Plus 51.

Fontographer 3.0 249.

Antic Software

Business Forms - PageMaker
Vol. 1 Human Resources 27.

Vol. 2 Inventory/Stock 27.

Vol. 3 Operations/Admin. 27.

Flexform Business Templates
Volume I or II 47.

Ashton-Tate

dBASE Mac 294.

Full Impact 248.

FullWrite Professional 255.

Berkeley System Design

After Dark 24.

Stepping Out 2.01 50.

Blyth Software

Omnis 5 Incrementer 74.

Omnis 5 Single User 345.

Bootware Software

ResuméWriter - Pro 58.

ResuméWriter - Student 18.

Borland International

Reflex Plus 188.

SideKick 2.0 67.

Turbo Pascal 1.1 67.

Turbo Pascal Tutor 1.0 49.

Bright Star Technology

Hyper Animator 1.5 98.

Interface 229.

Brøderbund

PosterMaker Plus 34.

Print Shop 35.

TypeStyler 128.

Caere

OmniPage 2.0 549.

Casady & Greene

AME 1-10 Users 978.

AME 1-5 Users 584.

AME Single User 179.

QuickDEX 31.

MBG
30-60 day money back
guarantees on many items. Ask!

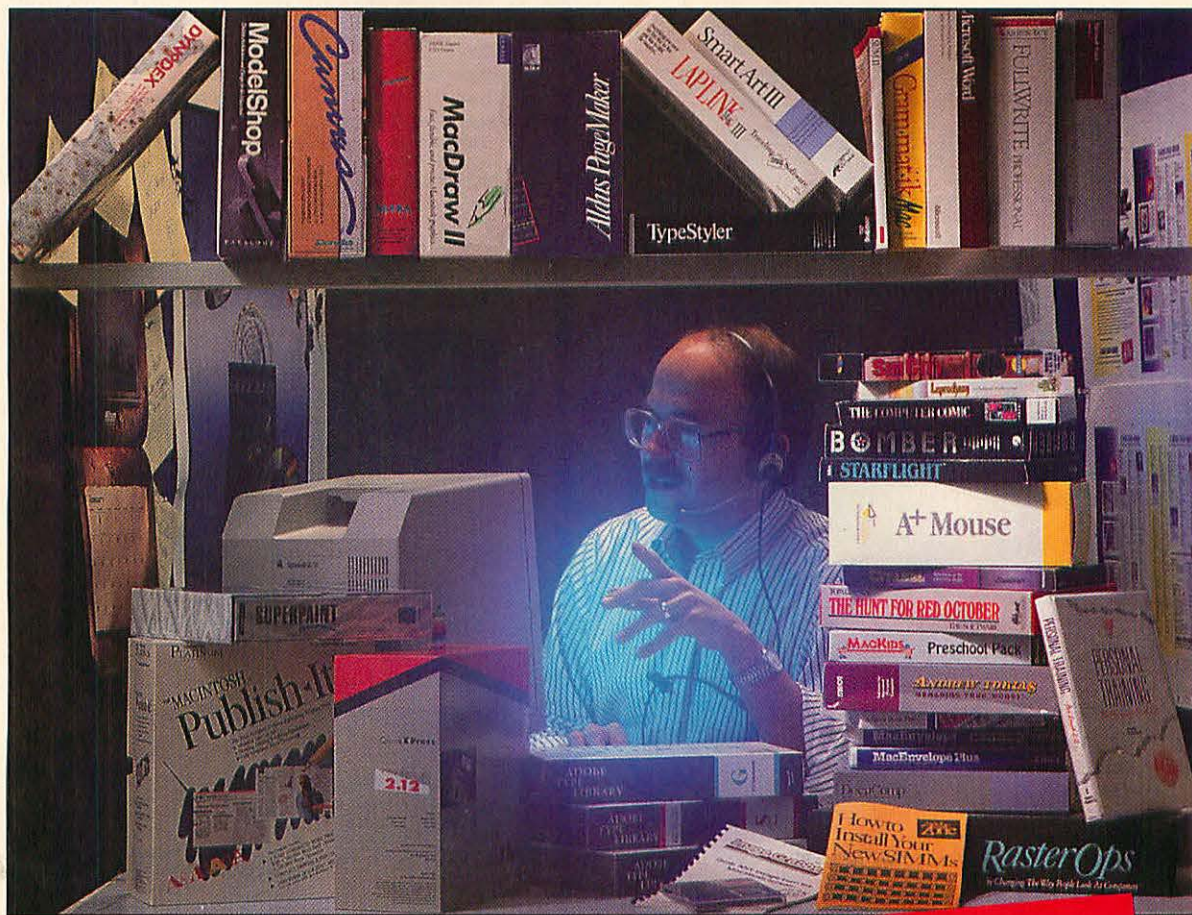
**OVERNIGHT DELIVERY
\$3 PER ORDER**

THE INSIDE STORY

On The MacZone

When it comes to choosing the right software or hardware products for your specific needs, get the straight story from a MacZone advisor. Phone the Zone and you'll talk with a knowledgeable, experienced Mac user who is working with the latest product versions. Your advisor will help you decide with clear answers to your questions instead of hype and sales pressure.

We'll save you time and frustration with valuable information before you order. And we'll save you money with some of the lowest prices anywhere. For the ideal solution to your Mac needs, give us a call. We're the Mac authority.



Every MacZone advisor has instant access to the programs you may be considering via our in-house designed database. Your order will be placed and processed on a Macintosh SE/30 with 5 megs of RAM, a SyQuest 44 removable, linked to our state-of-the-art Ethernet twisted pair network.

The Mac Zone

1-800-248-0800

Intl: (206) 883-1975 Canada: 800-248-0344 FAX (206) 881-3421

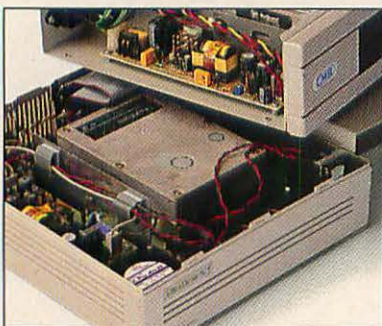
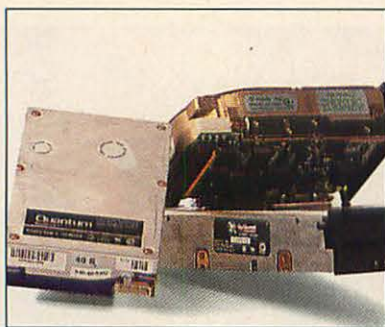
Where savings are huge and advice is free. Why buy anywhere else?

The inside story on hard drives.



From the outside, hard drives look very different.

Remove the fancy case and the true manufacturer is revealed.



You could spend a bundle for one of their fancy cases.

Or, save a bundle for exactly the same drive from the MacZone.



When you look inside the cases you'll discover the brand names are the same. The real difference is cost. The choice is yours — and so are the savings.

Zoner Loaner offer.

Our drives are backed by the best performance guarantee in the business. We'll ship a free loaner to you overnight if a MacZone drive ever needs warranty work.

Design a MacZone Drive



Let the Zone put together your perfect drive. Pick a drive. Pick a platinum or black case, or internal kit. We'll put it together, test it and guarantee it with the Zoner Loaner Program, and a 1 or 2 year drive warranty and send it out to you today for delivery tomorrow!

MacZone Hard Disk Cases

Black or Platinum

External Enclosure Kits

Half Height Enclosure 178.
Full Height Enclosure 220.
Syquest Enclosure 178.

Internal Mounting Kits

3.5" Drive Bracket 38.
5.25" Drive Bracket 69.

3.5" Hard Disks

CDC Half Height Drive
CDC 135 Mb CALL
CDC 172 Mb CALL

Connor Half Height Drive

Connor 100 Mb CALL

Quantum Half Height Drive

Quantum 40 Mb 410.
Quantum 80 Mb 648.
Quantum 105 Mb 748.

Seagate Half Height Drive

Seagate 20 Mb (28 ms) 315.
Seagate 30 Mb (28 ms) 355.

Seagate 45 Mb (28 ms) 398.
Seagate 60 Mb (28 ms) 530.
Seagate 80 Mb (28 ms) 598.

5.25" Hard Disks

CDC Full Height Drive

CDC 150 Mb 1,398.
CDC 300 Mb (16 ms) 1,845.
CDC 300 Mb H (10 ms) 2,198.
CDC 600 Mb 2,885.

CDC Half Height Drive

CDC 170 Mb 1,195.

Micropolis Half Height Drive

Micropolis 150 Mb 1,148.
Micropolis 330 Mb 1,895.

Micropolis Full Height Drive

Micropolis 675 Mb 2,938.

Seagate Half Height Drive

Seagate 60 Mb 460.
Seagate 80 Mb 495.

Syquest

Syquest 44 Mb Drive 625.



West Coast Paper

The finest computer paper products from the Northwest's premier paper supplier. Available in single sheet form for use with laser printers or continuous form feed paper for dot matrix style printers. Ask your MacZone salesperson for details about selection and shipping costs.

LaserWriter & ImageWriter Paper .. CALL



Sony Disks

Double sided (800k) and High density (1.4 mega-byte) floppy disks for use in any Macintosh. All Sony disks come complete with the Sony Full lifetime warranty - 100 percent certified error free. Available in boxes of 10, or save money by buying bulk packs of 50 disks at a time.

DS & HD Disks see listings



Keytronic

Positive, tactile key response. Ergonomic design for optimum user comfort. Quality key switches guarantee long-term reliability. Three-year limited warranty, and unlimited toll-free product support. Comes complete with Tempo II, a powerful easy to use macro program.

MacPro ADB 105 & Tempo II \$125.

Products & advice on your phone 1-800-248-0800

CE Software	
CalendarMaker 3.0	31.
DiskTop 4.0 w/GOfier	64.
In/Out (1-10 User)	188.
In/Out (1-5 User)	128.
MockPackage Plus	31.
QuickKeys 1.2	64.
QuickMail 2.2	
1-5 Users	210.
1-10 Users	315.
1-50 Users	CALL
Administrator Pack	CALL
Single User Pack	CALL



TypeAlign \$60.

Emerald City Software
Exclusively for ATM owners:
give type a change of face
with TypeAlign. Convenient
DA - for use with all major ap-
plications.

Central Point Software	
Copy II Mac 7.2	20.
PC Tools Deluxe	45.

Chang Labs	
C.A.T.	228.

Check Mark Software	
Cash Ledger	115.
MultiLedger 1.3	235.
Payroll	175.

Claris	
Claris Cad	589.
FileMaker II	220.
MacDraw II	294.
MacPaint 2.0	94.
MacProject II 2.0	370.
MacWrite II	179.
...w/FileMaker II Bundle	298.
...w/MacDraw II Bundle	368.
SmartForm Designer	295.

Computer Associates	
Simply Accounting 1.1	218.

Connect	
MacNet	39.

Connectix	
Virtual - Mac II	116.
Virtual - Mac II w/PMU	188.
Virtual - SE/30, IIX, IIXc	116.

Craig Management Systems	
ScheduleMaker	299.

Cricket Software	
Cricket Color Paint	169.
Cricket Draw	167.
Cricket Graph 1.31	115.
Cricket Paint	65.
Cricket Presents 2.0	285.
Pict-O-Graph	79.

Dantz Development	
Retrospect	149.

DataViz	
MacLink Plus PC 4.0	122.
MacLink Translators	98.

Dayna Communications	
DOS Mounter	59.

Deneba Software	
BigThesaurus	59.
Canvas 2.1	185.
Coach Professional	114.
Comment 2.0	54.
UltraPaint	129.

Digital, etc.	
Business Sense 1.2	268.

DigitalTalk	
SmallTalk/VMAC	125.

Dubl-Click Software	
Calculator Const. Set	45.

Dubl-Click, WetPaint	
1 & 2 Classic Clip Art	39.
3 & 4 For Publishing	39.
5 & 6 Animal Kingdom	39.

7 & 8 Special Occasions	39.
9 & 10 Printer's Helper	39.
11 & 12 Industrial Rev.	39.
13 & 14 Old Earth Alm.	39.
15 & 16 Island Life	39.
17 & 18 All The People	39.
World Class Fonts	
Vol 1 & 2 (Originals)	39.
Vol 3 & 4 (The Stylish)	39.
Vol 5 & 6 (Giants)	39.
Vol 7 & 8 (Triples)	39.
World Class LaserType	
Vol 1 - 9	each 39.

Electronic Arts	
Disk Tools Plus	31.
Studio/1	96.
Studio/8	296.
Thunder II	49.

Emerald City Software	
Smart Art 1, 2 & 3	each 84.
Type Align	60.

Farallon	
PhoneNet Check Net	64.
Screen Recorder	127.
Traffic Watch	128.

Timbuktu 3.0	
Single User	95.
30 User Pack	1,285.
Timbuktu Remote	125.
...w/9600 V.32 Modem	895.

Farallon/Electronic Arts	
MacRecorder 2.0/Studio 1	210.

Fifth Generation	
Disk Lock	108.
Fast Back II	107.
PowerStation 2.5	34.
Pyrol 3.3	14.
Suitcase II	44.

Foundation Publishing	
Comic Strip Factory	38.
#1 Office Days	21.
#2 Kid Stuff	21.

Fox Software	
FoxBASE+ 2.0	294.
FoxBASE+ Multi User	388.
FoxBASE+ Runtime	179.

FreeSoft	
Red Ryder Host 2.0	99.
White Knight 11	85.

Generic Software	
Generic CADD Level 1	84.

Hayas	
Smartcom II 3.1	85.

Help Software	
Desktop Help for Excel	49.

High Performance Systems	
STELLA 2.1	385.
STELLA StackIt 1.0	275.

HJC Software	
Virex 2.2	52.

ICOM Simulations	
HyperTMON	58.
On Cue 1.3	35.
TMON 2.8.2	87.

Individual Software	
101 Macros for Excel	36.
101 Scripts & Buttons	36.

Informix	
Winz 1.1	245.

Infosphere	
Liaison	175.

Innovative Data Design	
Dreams	325.
MacDraft 1.2b	178.

Insight Development	
MacEnvelope	79.
MacPrint 1.2	94.

Insomnia Solutions	
Soft PC	245.
Soft PC Portable	245.

Intuit	
Quicken 1.5	36.

Jam Software - Smart Alarms	
Single User Version	48.
1-4 Users	99.
5-8 Users	145.
9-15 Users	195.
16-25 Users	295.

Kent Marsh	
MacSafe	87.

Night Watch	87.
QuickLock	56.
Kiwi Software	
KiwiEnvelopes!	38.
Layred	
At Once!	285.
Insight Expert Series	
Accounts Payable	399.
Accounts Receivable	399.
General Ledger	399.
General Payroll	395.
General Time Billing	399.
Inventory	399.

Lefraset	
ImageStudio	274.
Lefraset	274.
ReadySetGo! 4.5	274.

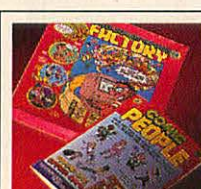
Lexpertise U.S.A. Inc.	
Mac Proof 3.2.1	114.

Loop Software	
Picture Book	39.

Lundeen & Associates	
Works Plus Command	84.
Works Plus Spell	56.

Mac Master	
FEdit +	28.

MacroMind	
MacroMind Accelerator	117.



Comic Strip Factory & Comic People 1&2 - see list
Foundation Publishing
Software for creating your
own comic strips. Also avail-
able: *Comic People* (clip art
comic characters).

Business Hours

Our phone lines are open for orders:

Mon - Fri:	8am to 1am Eastern Time 5am to 10pm Pacific Time
Sat & Sun	9am to 9pm Eastern Time 9am to 6pm Pacific Time

Customer Service & Tech Support:

Mon - Fri:	11am to 7pm Eastern Time 8am to 4pm Pacific Time
-------------------	---

Ordering Information

We accept VISA, MASTERCARD, AMERICAN EXPRESS & OPTIMA Card. No surcharge added.



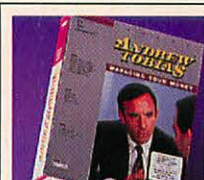
- If we must ship a partial order, we never charge freight on the shipments that complete the order (U.S. only).
- Your credit card will not be charged until products ship.
- Personal and company checks under \$1,000 clear immediately. Allow one week for checks over \$1,000.
- Most check orders clear immediately.
- Government, School and Institutional PO's clear immediately (some corporate accounts require credit approval).
- No sales tax (except WA residents add 8.1% to total incl. shipping).
- All prices subject to change without notice.
- All items subject to availability.

Shipping Information USA

- All orders add \$3.00 per order. We ship all items Airborne Express overnight service. (Some rural areas require an extra day.)
- Orders placed by 7:30pm Eastern Time, 4:30pm Pacific Time (weekdays) for "in stock" items ship same day (barring system failure, etc.) for overnight delivery.
- APD/FPO orders shipped 1st class mail, charged by weight.
- Alaska, Hawaii call for special shipping information.

1-800-248-0800

Intl: (206) 883-1975 Canada: 800-248-0344 FAX (206) 881-3421
MacZone 18005 NE 68th St., Suite A110, Redmond, Washington 98052 USA



Managing Your \$ \$124.

Meca Ventures
Written by Andrew Tobias,
easily the most complete
Personal Accounting package
available for Macintosh.

Odesta

DataDesk Professional	285.
Double Helix III	337.
Double Helix Multiuser	289.
GeoQuery 1.0	198.

Olduvai Software

MultiClip	49.
Plus 1.1	114.
Read-It! 2.1	249.
Read-It! Personal	119.

Orange Micro

Alphabits	68.
Grappler Spooler	49.

Paracom

Milo	158.
Model Shop	377.
Swivel 3D 1.1	294.

Paragon Courseware

NIOS 2.02	224.
QUED-M	98.

Personal Bibliographic

ProCite	198.
---------	------



International Orders (Tel. 206.883.1975)

- We accept VISA, MASTERCARD, AMERICAN EXPRESS & Bank checks in U.S. funds.
- We ship anywhere in the free world, using the quickest & least expensive methods possible.
- 2nd Day Air Service, available to most of Europe, Australia, & Japan.
- Orders are shipped by FedEx, TNT SkyPack, Postal Service, Airborne, & UPS, please specify.
- Freight charged by weight.
- Approx. freight charges: 1-3 kilograms \$50., 4-7 kilograms \$100.
- If payment is made by check, please include adequate shipping charges, we will refund you the difference.
- All orders will ship complete unless otherwise stated.
- No surcharge added to shipping.
- When ordering by mail or FAX please include phone# & FAX#.
- All credit card orders must include shipping address & address to which your credit card bills come.

Electronic Orders

- E-Mail your orders or questions to us via CompuServe (73667.3636), GEnie (MACZONE) or Connect (MACZONE).
- MacZone uses CE Software's QuickMail to check our mail hourly.

Warranties & Guarantees

- All products are covered by a 120 day limited warranty...
- Defective software replaced immediately. Hardware replaced or repaired at our discretion after first 30 days.
- Mac Zone has a 30 day money-back guarantee on hardware.
- Software and hardware is subject to manufacturer's warranty. Defective items will be replaced immediately with like item(s).
- All hard drives come with a Zoner Loaner guarantee. Loan drives subject to availability (USA Only).
- If you are not completely satisfied with a purchase, many of the products we sell come with a 30 to 60 day money back guarantee. Ask for details when you place your order.
- All returns must have an authorization number. Call 800-248-0800.
- Mac Zone aims to please...

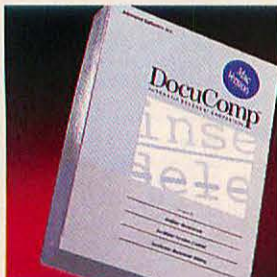
©1989 Multiple Zones International
The MacZone is a trademark of Multiple Zones International
This ad was created in PageMaker™ by the MacZone advertising department and
output to a Linetronic 300



Complete solutions for **HARDWARE** 1-800-248-0800

The Mac Zone

For overnight delivery, phone the Zone



Advanced Software
Compare two versions of a word processing file. DocuComp reports changes as minor as an added comma and as major as a complete rearrangement of text! Writers, editors, attorneys & programmers in Fortune 500, government & academic circles are adopting DocuComp as a standard!

DocuComp\$87.



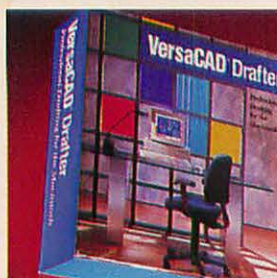
TOPS
The complete network solution. All services you need in a single package, including file sharing, InBox electronic mail and network printing capabilities. No need to dedicate a computer as a server. Networks can expand with the workgroup. Connects Mac, PCs and Sun Workstations.

TOPS Network Bundle for Macintosh\$188.



Layered
The next generation in business accounting software. So easy to learn, many business managers will be completely at ease doing their own accounting. So fast & flexible, professional accounting & bookkeeping firms can now use Mac for handling numerous companies & volume data.

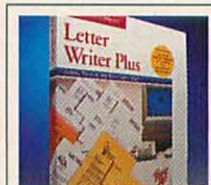
atOnce!\$285.



VersaCAD
Why play around with amateur CAD software when you can have the choice of professionals - VersaCAD. This full-featured 2D program has swept all the major Mac awards. Architecture magazine calls it "the standard of comparison for Macintosh CAD programs." Serious performance at a low cost.

VersaCAD Drafter\$419.

PLI Software	
Turbo Back	49.
Turbo Cache	59.
Turbo Optimizer	25.
Turbo Spool	59.
Turbo Bundle (all above)	120.
Power Up	
Address Book	55.
...w/Leather Notebook	83.
Fast Forms	89.
Preferred Publishers	
DAtabase	68.
Exposure	52.
Vantage	51.
Prescience	
Expressionist 2.03	78.
Theorist	229.
Pro Plus Software	
Wall Street Investor	395.
Prometheus	
Macknowledge	130.



Letter Writer PlusCALL
Power Up!
A handy desk accessory that puts powerful, easy to use letter writing and mail merge tools at your immediate disposal.

ProVUE	
Panorama 1.5	199.
Quark	
QuarkExtras	55.
QuarkStyle	169.
XPress 2.12	455.

Reference Software	
Grammatik IV	56.

Sabastian Software	
Image Grabber 2.0	31.

Satori	
Bulk Mailer 3.2.3	77.

Select Micro Systems	
Exstatix 1.2	214.
MapMaker 4.0	239.

Silicon Beach Software	
Digital Darkroom	248.
Super 3D	315.
Super Card	125.
SuperPaint 2.0	124.

SmethersBarnes	
ProtoType 2.1	185.

Smith Micro Software	
QuickLink	48.

Softview	
MacTax Federal 1989	64.
California Supplement	CALL
New York Supplement	CALL
MacTax Professional	CALL

Software Ventures	
Microphone 1.5	109.
Microphone II	215.

Solutions	
backFax	124.
Curator	72.
SmartScrap & Clipper	45.
Super Glue II	61.

Somak	
Script Edit	49.

SuperMac Software	
Disk Fit 1.5	58.
Network Disk Fit	225.
PixelPaint 2.0	224.
PixelPaint Pro	389.
Sentinel 2.0	86.
SuperSpool 5.0	58.
SuperLaserSpool 2.0	
Single User	85.
Multi User (1 to 5)	289.

Survivor Software	
Invoice II	49.
MacMoney 3.5	59.

Symantec	
Just Enough Pascal	49.
Lightspeed Pascal 2.0	99.
More II	249.
S.A.M.	CALL
S.U.M. II	94.
Think C 4.0	165.

Symmetry	
Acta Advantage	64.
HyperDA 1.2	48.
Key Plan	245.
Picture Base 1.2	54.

Synergy Software	
KaleidaGraph 2.0	145.
Versa Term 4.0	88.
Versa Term Pro 3.0	174.

Synex	
MacEnvelope	81.
MacEnvelope Plus	179.

T/Maker	
WriteNow 2.0	108.

Tactic Software	
ArtClip 1st Ed	49.
ArtClip 2nd Ed	64.
ArtFonts 1, 2 & 3	ea. 48.
ArtFonts Pak	129.
FontShare	129.
Icon-It	46.
Sound Clips 1	48.
Sound Clips 2	48.

TGS Systems	
Prograph	126.

TimeSlips Corporation	
TimeSlips III	168.

Timeworks	
Hyperworks Organizer	57.
Publish It!	219.

TML Systems	
TML Pascal II 3.0	56.
...w/MPW 3.0	108.
TML Source Code Library	39.

TOPS	
DOS Administrator	215.
Mac Administrator	215.
InBox 3.0/ + Macintosh	628.
TOPS (DOS Version)	99.
TOPS Network Bundle (Mac Version)	188.
TOPS NetPrint 2.0	117.



Director\$439.
MacroMind
Create full color & sound animated presentations, storyboards, educational courseware, point of sale displays, or music videos.

Totem Graphics	
Color Clip Art by Subject	

Birds	98.
Domestic Animals	98.
Fish	98.
Flowers	98.
Food	98.
Holidays	98.
Insects	98.
Nautical	98.
Sports	98.
Tools & Hardware	98.
Wild Animals	98.
Women	98.
Color Clip Art by Volume	
1 - 12	each 74.

Traveling Software	
Lap-Link Mac 2.0	81.
Lap-Link Mac Release III	
Connectivity Pack	128.
Lap-Link Mac Release III	189.
Network Pack	

Trendware	
XCAL	77.

True BASIC, Inc.	
True BASIC 2.02	56.

True BASIC Graphics Toolkits	
3-D Graphics	43.
Business Graphics	45.
Scientific Graphics	43.
Developer's	43.
Mathematician's	43.
Sorting & Searching	43.
Advanced String	43.
Communications Support	43.
FORTAN Converter	43.



True BASIC Toolkits ..\$43.
True BASIC, Inc.
Extend the capabilities of the True BASIC language system with powerful libraries of optimized subroutines developed by experts!

U.S. Micro Labs	
FontSizer II	69.

VersaCad	
VersaCad Drafter	419.

Visionary Software	
Synchronicity	36.

Williams & Macias	
myDiskLabeler	28.

...for ImageWriter	33.
...for LaserWriter	33.
Labels, 216 (ImageWriter)	15.
Labels, 216 (LaserWriter)	18.
Sticky Business	89.

WordPerfect Corp.	
WordPerfect 1.0.3	189.

Working Software	
QuickLetter	73.

Xerox (Datacopy)	
AccuText	545.

Zedcor Inc	
DeskPaint/DeskDraw	64.
ZBasic 5.0	89.

HARDWARE

Scanners

Abaton Scanners	
300/GS (8 Bit)	1,495.
300/S (4 Bit)	1,198.

Logitech	
Scan Man	320.

Mirror Technologies	
Flatbed Scanner 200dpi	498.
Flatbed Scanner 300dpi	625.

RasterOps	
TrueCapture 324	1,995.
...w/ColorBoard 264	2,395.
w/Comp. Video Option	2,398.

Sharp Color Scanners	
JX 300	3995.
JX 450	5995.

Thunderware	
Lightning Scan	368.
ThunderScan 5.0	179.

Modems	
Everex	
EMAC Md2400 MNP 5	198.

Hayes	
Smartmodem 2400	385.
Smartmodem 9600	899.

MacTech - SmartLink Modem	
2400m (MNP 5)	245.
2400s	139.

Prometheus	
9600m Plus V.32	768.

Shiva Corporation	
NetModem V2400	439.

Supra Corp.	
Supra Modem 2400	119.

MBG
30-60 day money back guarantees on many items. Ask!

OVERNIGHT DELIVERY
\$3 PER ORDER

One call source for Mac solutions 1-800-248-0800



Felix \$125.

ALTRA

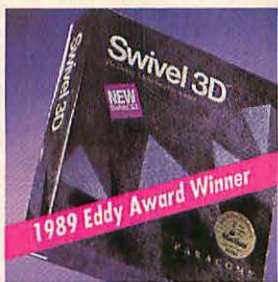
A completely new design in pointing devices. Designed to be used with the fingers, using the same motion as writing with a pen. The optical measurement system combined with the on-board micro processor enables Felix to provide unmatched ease of use and pointing control.



MacEnvelope & Plus see listings

SYNEX

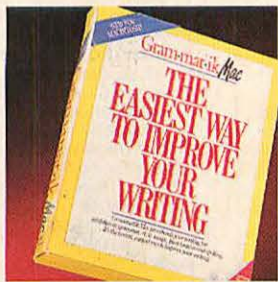
MacEnvelope: Print graphics, messages, mailing addresses, return addresses & Postal Bar Code on any envelope or label on any printer. **MacEnvelope Plus:** 100,000 names per file, eliminates duplicate addresses, tracks names with comments & flags, multi level sorts.



Swivel 3D™ \$294.

Paracom

Best selling fastest color drawing/modeling program. Ideal for newsletter publishers graphic artists, animators, illustrators, product designers, communication specialists. Endless uses: images, overheads, charts, slides, logos, storyboarding, animation. Free Image Library, req. 1mb.



Grammatik Mac IV \$56.

Reference Software

This full featured grammar & style checker can help anyone improve their writing. Finds thousands of common errors by parsing a sentence, comparing each word against a complete collection of writing rules, and lets users fix them immediately. Answers most grammar & style questions.



Mac Recorder & Studio/1 Bundle ... \$210.

Farallon

To capture, manipulate, bend, twist, echo, or just generally play with sound & sound resources, MacRecorder does it all.....\$162.

Electronic Arts

Studio/1 is a unique combination of black & white graphics combined with powerful and EASY on screen animation.....\$96.



SmartLink 2400S \$139.

SmartLink 2400M ... \$245.

MacTech

2400 baud modem, Bitcom communications software, and Mac to modem cable in one complete package.

Telebit

T-1000 (9600 BPS)	699.
T-2000 (19,000 BPS)	1,254.
T-2500 V.32 (19,000)	1,254.

U.S. Robotics

2400 Baud	325.
9600 HST Baud	685.

Monitors & Cards

Micron Color Cards

for SE/30, II, IIX, ILCX, & ILCI	
Xceed (8 Bit - 13")	385.
Xceed (8 Bit - 19")	598.

NEC Color Monitors

NEC MacSync 14"	498.
NEC Multisync XI 20"	2,695.

RasterOps

ClearVue/SE 19" Monitor w/ 16MHz Board	1,595.
Trinitron 19" Monitor	3,398.

ColorBoards

108+ (II, IIX, ILCX, ILCI)	899.
108+ (SE/30)	1,045.
224 (32 Bit - 19")	3,151.
264 (II series - 13")	755.
264 (SE/30 - 13")	1,038.

Sony - Color Multiscan

14" 1304 HG Color	795.
16" HG Color	2,498.
19" HG Color	3,198.

Accelerators & Upgrades

Dove

MacSnap Upgrades

524 (512k to 1 Mb)	192.
524e (512k to 1 Mb)	185.
524s (524e w/SCSI)	235.
548 (512k to 2 Mb)	432.
548e (512k to 2 Mb)	415.
548s (548e w/SCSI)	475.
SCSI Port Adapter	109.

Marathon 020 SE Accelerators

MSE1 (Board Only)	419.
MSE2 (...w/1 Mb)	695.
MSE3 (...w/68881)	579.
MSE4 (...w/68881 & 1Mb)	875.

Marathon 030 Accelerators

Mac II series or SE/30	ea. 965.
Marathon Racer	148.

Macintosh Memory Upgrades

available in 70ns - 120ns	
256k SIMMs	
1 Mb SIMMs	
4 Mb SIMMs	Call for prices

Motorola

Math Co-Processors

68882 - 16MHz	289.
68882 - 25MHz	399.
68882 - 33MHz	695.
68882 - 40MHz	748.

National Semiconductor

Maccelerator A/Ux	469.
-------------------------	------

Orchid Technology

Mac Sprint II	249.
---------------------	------

Total Systems

Gemini 020/030 Accelerators	
68020 SE - 16MHz	697.
68020 SE - 25MHz	1,118.
68030 SE - 16MHz	976.
68030 SE - 20MHz	1,118.
68030 SE - 25MHz	1,285.
Gemini (allows user to put Gemini 020/030 Accelerators in Mac+, 512K, 512K, & 128K. Includes internal fan, SCSI port, and space for extra RAM memory)	149.

Hard Disks & Backups

Everex - EMAC Drives

60/60dtt Deluxe	1,495.
60t (Tape Backup)	658.
Impact Tape (150 Mb)	985.
Impact 40 Plus	735.
Impact 80	1,095.

PLI (Peripheral Land, Inc.)

Infinity 40 Turbo	998.
Infinity 40/40 Turbo	1,798.
Infinity Optical 600 Mb	3,998.
TurboFloppy 1.4	345.

Networking Hardware

Adaptec

Modem E/Thinknet	383.
Modem T/Twisted Pair	454.

Cayman Systems

Gator Box	2,159.
Gator Mail Gateway	698.
Gator Mail to Unix	698.
Gator Share Software	1,398.
Gator Card (Mac SE, II, IIX, ILCX, ILCI, or SE/30)	ea. 460.

David Systems

Twisted Pair Ethernet
Easy to install. Please call for information and current prices.



Icon-It! \$46.

Tactic Software

With a simple click on one of Icon-It!'s custom designed icons, you can select menu items, DA's, fonts, and even macros.

Dove

FastNet Equipment

FastNet AE	1,249.
FastNet SE or SE/30	365.
FastNet III	365.
II Intelligent Controller	545.
FI-1 Ethernet LAN/68020	
Accelerator SE	895.
SCSI CheaperNet	748.
SCSI Thickwire Ethernet	849.

Farallon - PhoneNet

DB-9	29.
DIN-8	32.
DIN-8 (10 Pack)	198.
Star Connector	19.
Star Connector (10 Pack)	198.
Star Controller	825.
Star Controller EN	CALL
Repeater	315.

Hayes

InterBridge	648.
-------------------	------

Kinetics

EtherPort	469.
EtherPort Lattis Net	498.
Fast Path	1,945.

MacTech

ZoneNet - DB-9 or DIN-8	17.
-------------------------------	-----

Nuvotech

NuVoLink SC	345.
Turbo Bridge	318.
Turbo Net - DB-9	22.
Turbo Net - DIN-8	21.
Turbo Net ST - DB-9	30.
Turbo Net ST - DIN-8	30.

Shiva Corporation

EtherGate	1,831.
NetBridge	339.
NetSerial	279.
TeleBridge	348.

TOPS

Flash Card (TOPS Dos)	158.
TOPS FlashBox	109.
TOPS Repeater	119.

Miscellaneous

Aapps Corporation

Micro TV	269.
----------------	------

Abaton

InterFax 12/48	259.
InterFax 24/96	418.
Quickstep Page Printer	3,295.

American Power Conversion

UPS 110SE	268.
-----------------	------



MacSprint \$249.

Orchid

Increases microprocessor throughput by an average of 22% to a max of 30% by eliminating wait states. Installs in 5 minutes.

Dayna Communications

Dayna Talk Connector	99.
----------------------------	-----

DaynaFile - Single Drive

DIO100 (360k)	498.
DIO200 (1.2Mb)	605.
DIO300 (720k)	605.
DIO400 (1.44Mb)	685.

DaynaFile - Dual Drive

DIO102 (360k/1.2Mb)	729.
DIO103 (360k/720k)	729.
DIO104 (360k/1.44Mb)	725.
DIO204 (1.2Mb/1.44Mb)	898.

Kurta - Is/ADB Tablets

Cordless 4 Button Cursor	64.
8.5" x 11" (w/Stylus)	254.
12" x 12" (w/Stylus)	384.
12" x 17" (w/Stylus)	624.

NEC CD ROM Drive

Battery Pack	68.
Intersect Cdr-35	495.

Orange Micro

Grappler C/Mac/GS	78.
Grappler LO, LS	ea. 102.
Grappler Mac LX	129.
Mac 286 NuBus Card	1,099.
Mac 86 NuBus Card	498.

Orchid Technology

Orchid Fax Modem	446.
------------------------	------

PCPCT (8mm Tape Backup)

Jetstream	4,725.
-----------------	--------

Qume

Crystal Print Publisher	2,950.
-------------------------------	--------

Summagraphics Bit Pad Plus

12" x 12" Tablet - ADB	315.
------------------------------	------

ENTERTAINMENT

Access Software

World Class Leader Board	25.
--------------------------------	-----

Accolade

4th & Inches	27.
FastBreak	27.
Grand Prix Circuit	27.
Hardball	26.
Mean 18	26.

Activision

Cosmic Osmo	41.
Manhole	29.
Manhole CD Version	35.

Addison Wesley

The Hobbit	26.
Fellowship of The Ring	26.
The Shadows of Mordor	26.
The Crack of Doom	26.

Braderbund

Ancient Art of War	26.
Ancient Art of War at Sea	26.
PlayMaker Football	32.
Shufflepuck Cafe	23.
SimCity 1.1	29.
SimCity Color	48.
Star Wars	24.
Where In Europe Is Carmen Sandiego?	29.
Where In The U.S.A. Is Carmen Sandiego?	29.
Where In The World Is Carmen Sandiego?	29.

The Mac
Zone

Ask about
product money
back guarantees



Check Mark Software

MultiLedge: combines G/L, A/R, A/P & Inventory into a single integrated program, w/invoices, statements & financial reports. **Cash Ledger:** entry level G/L program. **Payroll:** handles 1 to 1,000 employees, can be integrated with Cash Ledger, MultiLedge or used as a stand alone program.

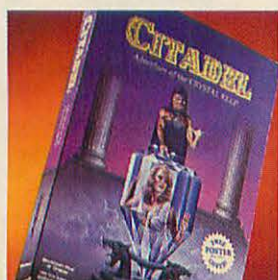
..... see listings



Software Innovations

Lets you open any document from the Finder, even if you don't have the application that created it. Assign documents to any compatible application by their creator or filename extension. Supports the Desktop Manager. Rated in 200 best Mac Products and awarded 4 1/2 mice by MacUser.

HandOff CALL



Postcraft International

Fantasy role playing climbs to new heights of challenge & excitement while exploring the most graphically realistic, 3-dimensional maze in the depths of the CITADEL. Sound & animation plus 60 animated monsters will keep any player on the edge of their seat.

Citadel \$32.



Fuji Disks

Receive a FREE Fujicolor Quicksnap camera with every 3 boxes ordered. Tested & certified 100% error free, complete with Fuji's 1ld lifetime warranty. 10 pack DS or HD disks available in standard beige or rainbow pack (5 different colors, screen cleaning cloth included & sturdy disk storage case).

DS or HD Disks see listings

Bullseye Software

Ferrari Grand Prix 32.
P-51 Mustang Flight Sim. 31.

Casady & Greene

Crystal Quest 2.2 25.
...w/Critter Editor 40.

Centron

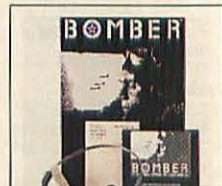
Casino Master B & W 44.
Casino Master Color 49.

Data East

Super HangOn 26.

Discovery Software

Arkanoid 26.



Bomber \$25.

Inline Design
Explosive WWII action. Digitized sound, animation, and a crew that talks back. Requires 1 Mb Mac, hard disk & HyperCard.

Electronic Arts

Bard's Tale 31.
Chessmaster 2100 32.
Chuck Yeager's A.F.T. 31.
Might & Magic II 38.
Panzer Battles 28.
Patton Vs Rommel 14.
Starflight 39.

Infocom

Arthur: Quest for Excalibur .. 25.
Quarterstaff 28.

Inline Design

Bomber (w/Headphones) 25.

Lucasfilm

Pipe Dream 28.

Mediagenic

Shanghai 19.

Micro League Sports

Micro League Baseball II 35.

MicroProse

Pirates! 35.

Microsoft

Flight Simulator 1.02 32.

Miles Computing

Fool's Errand 31.
Harrier Strike Mission II 31.
Puzzle Gallery 26.

Mindscape

Aussie Joker Poker 19.
Balance of Power 1990 29.
Colony 29.
Crossword Magic 29.
Deja Vu 29.
Deja Vu II 29.
Gauntlet 29.
Shadowgate 29.
Trust & Betrayal 29.
Uninvited 29.

Origin Systems

Autoduel 23.
Moebius 23.
Ogre 16.
Space Rogue 30.

Postcraft International

Citadel 32.

Premier Technology

NetTrek 34.
Strategic Conquest 2.0 34.

Shodan

Leprechaun 29.

Silicon Beach Software

Apache Strike 1.1 24.
Beyond Dark Castle 24.
Dark Castle 22.

Sir Tech

Wizardry 35.

Software Toolworks

Cribbage King/Gin King 38.
Hunt for Red October 27.
Life & Death 31.

Sphere

Falcon 2.2 30.
Gato 1.4 26.
Pt-109 26.
Solitaire Royale 19.
Tetris (Black & White) 19.
Tetris (Color Version) 22.
Welltris CALL.

Spinnaker

Sargon IV 26.

Strategic Simulations, Inc.

AD&D: Pool of Radiance 32.

Strategic Studies Group

American Civil War 30.
Halls of Montezuma 30.

Three Sixty

Sands of Fire 34.
Warlock 28.

Toyogo, Inc.

Nemesis Go Master 47.
Nemesis Joseki Tutor 28.

XOR Corporation

Lunar Rescue 33.
Mac Racquetball 36.
MacCourses 19.
MacGolf 32.
MacGolf Classic 52.
NFL Challenge 54.
Pro Challenge 28.
Road Racer 38.
TaskMaker 27.



Micro League Baseball II .. \$35.

Micro League Sports
Hall of Famers and All-Stars alike take the field on your own baseball diamond, and you're the manager!

EDUCATION

Bible Research Systems

The Word (KJV, NIV, NKJV, RSV) 164.
The Word Add-On 65.
The Word Verse Search 78.

Bright Star Technology

Alphabet Blocks 29.
Talking Tiles 25.

Broderbund

Calculus 58.
Geometry 58.
Physics 58.
Type! 18.

Carina

Voyager 1.2 88.

Davidson & Associates

Math Blaster 26.

First Byte

Dinosaur Discovery Kit 26.

Great Wave Software

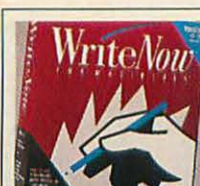
KidsMath 26.
KidsTime 25.
Number Maze 26.

Learning Company

Math Rabbit 31.
Reader Rabbit 2.2 31.

Nordic

Alphabetizer 27.
BodyWorks 27.
ClockWorks 27.
CoinWorks 27.
EarthWorks 27.
FlashWorks 27.
Lemonade Stand 27.
MacKids Preschool Pack 36.
Naval Battle 27.
Preschool Disk 1 27.
Preschool Disk 2 27.
Turbo Math Facts 27.
Word Quest 31.
Word Search 27.



WriteNow 2.2 CALL

T/Maker

1,400,000 word thesaurus, 135,000 word spell checker, direct MS Word compatibility. Still the easiest & fastest word processor.

Penton Overseas

VocabuLearn/ce
French Level 1 29.
French Level 2 29.
German Level 1 29.
German Level 2 29.
Italian Level 1 29.
Italian Level 2 29.
Japanese Level 1 35.
Japanese Level 2 35.
Spanish Level 1 29.
Spanish Level 2 29.

Personal Training Systems

Learn88 Training Series
A1 Beginning Illustrator 36.
A2 Int. Illustrator 36.
A3 Creating Special FX 36.
A4 Prec. Drawing Tech. 36.

MacTeach Training Series - The Basics

B1 Plus & SE w/out HD 36.
B2 Plus & SE w/HD 36.
B3 020 & 030 w/HD 36.
B4 Beyond the Basics 36.

Learn Freehand Training Series

FH1 Beginning Freehand 36.
FH2 Int. Freehand 36.
FH3 Creating Special FX 36.
FH4 Prec. Drawing Tech. 36.

Learn FileMaker Training Series

FM1 Beginning FileMaker 36.
FM2 Int. FileMaker 36.
FM3 Advanced FileMaker 36.
FM4 Tips & Techniques 36.

HyperEasy Training Series

H1 Using HyperCard 36.
H2 Creating Cards/Stacks 36.
H3 Basic Scripting 36.
H4 Advanced Scripting 36.

Learn Persuasion Training Series

LP1 Beg. Persuasion 36.
LP2 Int. Persuasion 36.
LP3 Creating Templates 36.
LP4 Creating Artwork 36.

MasterWorks Training Series

M1 Database & Form Let. 36.
M2 Advanced Database 36.
M3 Spreadsheets 36.
M4 Word Processing 36.

PageTutor Training Series

P1 Beginning PageMaker 36.
P2 Int. PageMaker 36.
P3 Tips & Techniques 36.
P4 Advanced Features 36.

LearnWord Training Series

W1 Beginning Level 36.
W2 Intermediate Level 36.
W3 Advanced Level 36.
W4 Additional Features 36.

Excelerate Training Series

XL1 Beg. Spreadsheets 36.
XL2 Int. Spreadsheets 36.
XL3 Adv. Spreadsheets 36.
XL4 Creating Bus. Graphs 36.
XL5 Building Databases 36.
XL6 Beginning Macros 36.
XL7 Advanced Macros 36.
XL8 Macros for Excel 2.2 36.
XL9 What's New for 2.2 36.

Simon & Schuster

Typing Tutor IV 29.

Software Toolworks

M. Beacon Teaches Typing .. 32.

Spinnaker

Typing Made Easy 25.

True BASIC, Inc.

Algebra 33.
Arithmetic 33.

MBG
30-60 day money back
guarantees on many items. Ask!

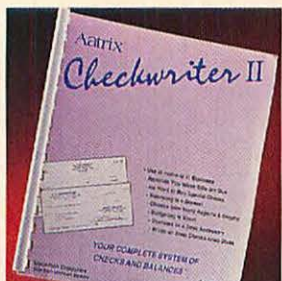
OVERNIGHT DELIVERY
\$3 PER ORDER

Complete solutions for ACCESSORIES 1-800-248-0800



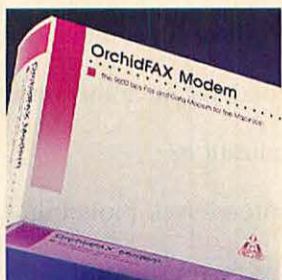
Datadesk
The Mac 101 keyboard is for all Mac users who use their keyboard for more than just typing. The 101 key layout, positive response keys and free MasterStrokes keyboard macro software take you beyond the limits like never before. French, Spanish & German versions also available.

Datadesk Mac 101 Keyboard \$135.



Aatrix
Prints on nearly any checkform, even prints on personal checks with Image-Writer or Laser-Writer. CheckWriter II reminds you of your bills due each morning. (You'll never pay a late fee again!) Also print envelopes or mailing labels from the built-in address database. 1990 Eddy Nominee.

CheckWriter II \$32.



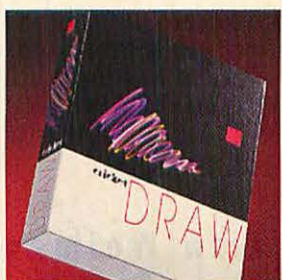
Orchid
The 9600 bps Fax and Data Modem for the Macintosh. Sends and receives faxes at 9600 bps for fastest transmission, and connects at 9600 bps with OrchidFAX and AppleFax modems. Package comes complete with BackFAX software and letter quality fonts for better looking faxes.

OrchidFAX Modem \$446.



XOR Corporation
The world has plunged into depression and devastation...the once mighty Kingdom is no longer. You must restore order and prosperity to the Kingdom, but you have no experience. To gain help, find the TaskMaker, and with his guidance and your courage, the Kingdom might be saved!

TaskMaker \$27.



Cricket Software
Cricket's answer to the need for sophisticated precision object oriented graphic tools for the Macintosh computer. Effectively capitalizes on the capability of PostScript printers. Includes enhanced text handling features, color, precise control, and advanced PostScript special effects.

Cricket Draw \$167.

Calculus	33.
Discrete Mathematics	33.
Pre-Calculus/Trig.	33.
Probability Theory	33.
TrueSTAT	33.
Combo Packs w/Workbook	
Algebra Combo Pack	39.
Calculus Combo Pack	39.
Pre-Calculus Combo Pack	39.

MUSIC

Ars Nova	
Practica Musica	69.
Bogas Productions	
Studio Session	44.
Super Studio Session	65.
Brass, Country, Heavy Metal, Sound Effects, String Quartet	each 13.

Brøderbund	
Jam Session	28.
Coda	
Finale 2.0	558.
Mac Drums	31.
MusicProse	169.
Perceive	49.

Electronic Arts	
Dix Music Const. Set	82.
Deluxe Recorder	98.

Farallon	
MacRecorder 2.0	162.

Great Wave Software	
ConcertWare Plus MIDI	108.

Mark of The Unicorn	
Professional Composer	389.
Professional Performer	395.

Passport Designs	
Click Tracks	309.
MasterTracks Jr.	89.
MasterTracks Pro 4.0	355.
MIDI Interface	79.
MIDI Transport	309.
Note Writer II	320.

Primera Software	
Different Drummer	58.

Resonate	
Listen 2.1	61.

ACCESSORIES

Abaton	
Pro Point ADB (SE & II)	79.

Acco	
Disk Page (2 Pages)	6.

Addison Wesley	
Inside Macintosh, Vol. 1	21.
Inside Macintosh, Vol. 2	21.



Business Sense \$268.
Digital, etc.
Integrated accounting package. Gen. Ledger, Accounts Receivable, Accounts Payable, Invoicing, Payroll, Budgeting & Reporting.



Where savings are huge and advice is free.

1-800-248-0800

Intl: (206) 883-1975 Canada: 800-248-0344 FAX (206) 881-3421

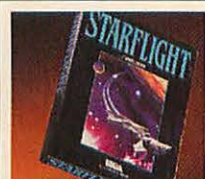
Circle 70 on reader service card

Inside Macintosh, Vol. 3	18.
Inside Macintosh, Vol. 4	21.
Inside Macintosh, Vol. 5	23.
Inside Macintosh, X-Ref	9.
Macintosh Programming Secrets	19.
Advanced Gravis	
MouseStick	64.
MouseStick (ADB)	79.

Altra	
Felix	125.

Apple	
HyperCard 1.2	39.
MacTerminal	99.
Toner Cartridges	
LaserWriter II Series	99.
LaserWriter Plus Series	96.

Avery Labels	
Address Labels	
2.5" x 15/16" (3000) White ..	12.
3.5" x 15/16" (1000) White ..	5.
3.5" x 15/16" (3750) White ..	13.
3.5" x 15/16" (500) Clear ..	13.



Star Flight \$39.

Electronic Arts
Boldly go where no game has gone before, into the most far-reaching outer space adventure ever. Over 800 worlds to explore.

Diskette Labels	
2.75" x 2.75" (250) White ..	14.
Mac Disks (630)	29.
3.5" (80) Color Coded	4.
File Folder Labels	
3.5" x 7/16" (1000) Asst ..	7.
Laser Printer Labels	
1" x 2-5/8" (3000) White ..	16.
1.5" x 4" (1400) White	18.
1/2" x 1.75" (2000)	7.
Laser Transparencies (50) ..	22.
Round 1.5" (300) White	7.

Bantam Books	
Illustrator 88 Handbook	19.
Mastering Wingz	21.
HyperCard Handbook	22.

Datadesk	
Hyper Dialer	24.
Mac 101 Keyboard	135.

Datashield	
MacDirector	79.

Ergotron	
MacTilt	68.
Mouse Cleaner 360	9.

Fuji Disks	
Double Sided (800k)	
10 Pack	13.
Rainbow 10 Pack	13.
Bulk (Units of 50)	each .70
High Density (1.44 Mb)	
10 Pack	22.
Rainbow 10 Pack	25.
Bulk (Units of 50)	each 2.10

Fujitsu	
800k Disk Drive	159.

Golden Ribbons	
Multi Colored	7.
Black	3.

Goldstein & Blair	
Macintosh Bible	19.
w/ Book Disk Combo	26.

Kalmar Designs	
Teakwood Disk File Cabinet	
135 Disks	29.



The Computer Comic . \$17.

Keyboard Comedy
Outrageous jokes for your computer. This desk accessory makes comic relief available any time of the day at the push of a button.

45 Disks	14.
90 Disks	21.

Kensington Microware	
Apple Security Kit System ..	34.
Dust Cover Mac SE	8.
Mac II Stand w/Cables	64.
Super Base	33.
System Saver Mac	64.
Tilt Swivel	21.
Turbo Mouse	108.
Universal Printer Stand	15.

Keytronics Keyboard	
Mac Pro Kb-105 ADB	125.

Kraft	
QuickStick (512k & Plus) ..	39.
QuickStick ADB	49.

Lynx	
Turbo Trackball ADB	58.

Mac Packs	
Gray, Navy, or Wine	
ImageWriter Bag	45.
Mac Plus/SE Bag	55.
Mac SE Bag Xt (Extended Keyboard)	69.

Mac Zone	
7 Outlet Noise & Surge	
Protector	24.
Mouse Pads	each 6.
SCSI Tester	39.
Mac Tool Kit Mac w/Grounding Strap	15.

Maxell Backup Tapes	
150 Mb Tapes	24.
60 Mb Backup Tape	19.

Microlytics	
Personal Organizer w/Mac Advantage	92.

Microsoft Press	
Excel In Business for 1.5	20.

Mobius	
Fanny Mac	59.

MSC Technologies	
A+ Mouse (512k & Plus)	58.
A+ Mouse ADB	75.

Portfolio Systems	
DynoDex Address Book	88.

Sony Backup Tapes	
DC 2000 40 Mb. Tape	19.
Qd-600a 150 Mb. Tape	CALL

Sony Disks	
Double Sided (800k)	
10 Pack	13.
Bulk (Units of 50)	each .79
High Density (1.44 Mb)	
10 Pack	22.
Bulk (Units of 50)	each 1.80

Star Forms Computer Paper	
Pro Print 8.5 x 11 20# White	
Laser Bond 500/Ream	7.
Pro Print 9.5 x 11 20#	
Kleenedge Bond 1000/Box ..	18.
Pro Print 9.5 x 11 20#	
Kleenedge Bond 500/Pac ..	10.

Targus Bags	
Black, Gray, Navy, or Wine	
Deluxe for Extended Kybd ..	68.
ImageWriter (Black only) ..	45.
Mac/SE Bag (Black only) ..	54.
Ilcx/Ilci Bag	78.

MULTIMEDIA

IS IT REAL?

Juggling media
types for maximum
impact—multimedia's
promises and
problems

Buzzwords intrigue but rarely inform. The term *multimedia*, for instance, is bandied about as though we all agree on its definition and implications. The truth is, consumers, developers, and computer pundits have stretched its meaning until there is little left beyond hyperbole and generalizations.

To find out what lies behind the hype, we interviewed pioneering multimedia developers. We looked at the available production tools and publishing options. Finally, we drew up a definition of multimedia as it applies to the Macintosh.

In the course of our research, we listened to pie-in-the-sky visionaries, sympathized with frustrated developers, and talked to everyone from computer retailers to high-school teachers. We catalogued the tools available to multimedia producers (see "Multimedia Production Tools"). Finally, after juggling the pieces of the puzzle, it became clear that asking whether or not multimedia computing lies in our future is a bit like our grandparents' wondering whether or not movies should have sound. It's not a question of if, but when.

by Suzanne Stefanac and Liza Weiman



MICHAEL LEWIS/ONYX



Using his solar-powered multimedia lab, ecologist Mike Hamilton catalogs the wildlife of the James San Jacinto Mountains Reserve.

Multimedia Defined

- Multimedia incorporates several media types—text, graphics, audio, animation, video—in a single computer document; sound and/or motion are integral to a true multimedia project.
- What distinguishes multimedia from film or video is interactivity. Watching a detective movie is one thing, solving the mystery is another. Computer-based multimedia allows the user to determine the pace and path through ever-branching options.

▪ Multimedia developers must be much more than programmers, video producers, and audio wizards. They must also be interface designers able to knit several media into easy-to-navigate documents.

Where Is the Knowledge Navigator?

Apple touts the Macintosh as a multimedia machine, primed for easy integration of multiple media. As a teaser, John Sculley often shows a video about the Knowledge Navigator—a simulated notebook-size computer that talks and listens, fetches clips from video databases, and even schedules appointments for its lucky owner. But as much as we'd like to believe that

voice-activated electronic butlers are in our near future, it just isn't true.

The problem, as usual, lies not in the vision, but in the technology. Before full-motion video can be delivered over networks and real-time animation is available in 32 bits, we'll need CPUs and graphics processing capabilities many times faster than those currently available. Storing these memory-hungry multimedia files is another problem in search of a solution. And although Articulate Systems' Voice Navigator looks promising, voice-recognition technology for personal computers is still in its infancy—a fact even Apple tacitly admits.

In a recent Desktop Media campaign aimed at the business community, Apple featured a multimedia presentation of a cartoon car with propellers—the HeloCar—that included page layout, 3-D graphics, 35mm slides, and overhead transparencies. Screens with HyperCard-like buttons let you choose between an animation of the car flying, schematic drawings of the interior of the engine, or dynamic cost breakdowns. What this slick presentation lacked was 32-bit color animation, full-motion video, and voice annotation.

Other Platforms

While Apple is promoting the Macintosh as a platform for multimedia, other computer companies are pitching their own development schemes. Next, for instance, is attracting some first-rate developers (see "Multimedia on the Next"), and IBM's InfoWindows with TouchScreen Display and Sony's View System have been popular in the

MULTIMEDIA PRODUCTION TOOLS

Products on this line are arranged according to the amount of time and money you must invest if you want to include sound, animation, or video in your multimedia documents. —Suzanne Stefanac



Basic Authoring
HyperCard 1.2.5, Apple Computer, \$120



Basic Animation
MacMovies, Lapis Technologies, \$99
Studio/1, Electronic Arts, \$99
VideoWorks II, MacroMind, \$295
VideoWorks II HyperCard Driver, MacroMind, \$99.95



Basic Audio Input and Editing
The Voyager CD AudioStack,
The Voyager Company, \$99.95
MacRecorder, Farallon Computing, \$249



Talking Agents
HyperAnimator, Bright Star Technology, \$199.95
interFACE, Bright Star Technology, \$499.95

corporate community for years. Intel's continued promise of affordable DVI (digital video interactive) standards might make the compression and playback of full-motion (30-frames-per-second) video a reality on the IBM PC—someday.

The problem with Intel's compression scheme is that although you might be able to play back compressed video on a personal computer, it takes a large, expensive computer to compress the data in the first place. Personal-computer owners can inexpensively play multimedia releases that were very expensive to produce. Just as with records or CDs, consumers can play them, but not make them.

Apple, in contrast, has stated publicly that its vision requires that the Macintosh be able to both make and play multimedia on the desktop. Apple believes that users should have the option to be both consumers and producers.

In keeping with this vision, HyperCard was Apple's early entry into the multimedia sweepstakes. Because it enables users to write their own simple interactive applications and because it can be used to access and control other media—CD ROM and videodisc players, for instance—HyperCard struck a chord. As HyperCard creator Bill Atkinson notes, "We were surprised at the way people jumped right in and started using HyperTalk. This was probably due to a pent-up demand for user programmability."

The Multimedia Pyramid

Of course, even if Apple's vision becomes a reality, most people will

Users should have the option to be both consumers and producers

probably encounter multimedia presentations in boardrooms and salesrooms, schools and training centers, museums and shopping-mall kiosks. Some people will learn to add a few sounds or short animations to presentations. Very few, however, will be in a position to invest the time and money necessary for creating truly professional multimedia projects. Multimedia production, particularly if video is involved, will still be in the hands of the few who have access to advanced technology. (For an overview of the costs involved in optical publishing, see "Be Your Own Producer.")

On the other hand, homemade videos are quite popular, and the fact that the quality isn't professional doesn't seem to matter to most people. Multimedia presentations are similar. For a small investment in time and money, you can incorporate text, graphics, and sound into your documents. For a little more money, you can add color, animation, and CD-quality sound. For still more money and time you can use digitized video still-frame pictures. For a lot more money you can include full-motion video. And at the highest end of the spectrum, you can incorporate real-time video complete with computer-generated text and graphic overlays.

The following profiles illustrate

some of the ways in which people have found multimedia to be a cost-effective solution to problems in their workplaces. (For a listing of multimedia production tools arranged loosely according to the time and money investments involved, see "Multimedia Tools," the table running along the bottom of these pages.)

In-House Expertise

In a fast-changing world, keeping employees and customers up to date on technical information is a challenge many companies face. Multimedia-based training, because it can incorporate voice, music, animation, and interactive course work, has proven popular in many corporations.

Codex Corporation, a subsidiary of Motorola, is a data-communications and networking-services company that needed to find a way to effectively train its sales representatives, applications engineers, systems engineers, customer-service representatives, and customers in the basics of digital telecommunications technology.

Working with interactive multimedia developers Madeline Butler and Paul Raila, Codex produced Basics of Digital Voice Technology, an 8MB interactive HyperCard stack that replaces an eight-hour lecture-type course with a three- to four-hour interactive one.

Incorporating VideoWorks II animation, sounds digitized with MacRecorder, and animated characters produced with HyperAnimator, this interactive training course simulates a year in the life of a communications manager in a medium-size company.

"We chose to make it a simulation

Midrange Audio Input and Editing
Audiomedia, Digidesign, \$995
Sound Designer, Digidesign, \$999

Midrange Authoring

ArchiText, BrainPower, \$395
Course Builder, TeleRobotics International, \$395
Guide, OWL International, \$295
Interactive Teacher, American Intellivare Corporation, \$295
SuperCard, Silicon Beach Software, \$199
*Plus, Spinnaker Software Corporation, TBA

Basic Video Digitizers

Xap Shot, Canon USA, \$799
ComputerEyes, Digital Vision, \$249.95
ComputerEyes Pro Color Digitizer, Digital Vision, \$450
HyperVision, Pixelogic, \$195
MacVision, Koala, \$400

Midrange Animation

MacroMind Director, MacroMind, \$695
MacroMind Director Accelerator, MacroMind, \$195

Midrange Editing

*Media Tracks, Farallon Computing, TBA

TV Window on Mac

MicroTV, Aaps Corporation, \$395
*BigTime TV, Hyperpress, TBA

*Not shipping at press time.

Getting the Big Picture

Ecologist Mike Hamilton, resident director of a University of California ecological reserve for teaching and research, wanted to create an interactive ecological database both as a teaching aid and as a model for cataloging the natural world. In order to do so, he built a solar-powered multimedia lab.

Using a Mac II with an Apple 8-bit video board, a 40MB hard disk, a 20MB hard disk for backup, a Digital Vision ComputerEyes Pro Color video digitizer, a Pioneer 4200 videodisc player, and a 19-inch Sony multisync monitor, Hamilton has created the Macroscopic Ecology Laserdisc, a videodisc with over 25,000 still images, full-mo-

tion video sequences, and a 30MB HyperCard stack that contains detailed ecological information. His goal is to create a scientifically accurate and comprehensive database appropriate to the needs and levels of interest of groups from kindergartners to Forest Service professionals.

*"The important thing
is that
this doesn't have to be
a big-budget
enterprise"*

Using still-frame video cameras from Canon—the Xap Shot and RC701—and an 8mm Sony HandyCam camcorder, Hamilton and his crew of researchers take video images in the field of all relevant biological phenomena, including close-ups, full-motion sequences of animal behavior, and a highly structured 150-frame view of an area that becomes a *videomap*, a series of overlapping images that record everything a person can see while standing in a particular spot. Information about the location, format, date, time, and photographer of each image, as well as species information and ecological classification, is added back

at camp on HyperCard cards using a Macintosh Plus. Parabolic microphones and cassette tape recorders are used to capture animal sounds, and MacRecorder is used to digitize the sounds and add them to the stack back at the office.

Hamilton makes three to four videodiscs per year for a total of about \$3000. Working with Laser Edit, a post-production video service bureau in Los Angeles, he transfers his video in animation mode, one frame at a time, onto professional 1-inch-format videotape. This is then recorded on an Opticle Disc Corporation Mark II WORM drive to make a one-shot check disc that is LaserVision 2-compatible (playable on standard industrial players). This plastic disc cannot be replicated, but at \$300 per check disc it is an economical way to prototype the version of the Macroscope that Hamilton will eventually produce in large quantities (see "Be Your Own Producer").

"The important thing," Hamilton says, "is that this doesn't have to be a big-budget enterprise. You can make multimedia happen on a Mac Plus with less than \$1000, once you own the basic equipment. This stuff is like Hollywood, it will absorb as much money and time as you're willing to put into it—your budget may go way beyond \$1000 if you don't plan carefully."

Selling in the Twenty-First Century

The people at Live Marketing have been creating presentations for large corporations for the past 17 years. They've used slides, multiple slide projectors, video walls, lasers, and even puppets and holography to sell,

Video In and Out
NuVista (1MB, 2MB, 4MB RAM), Truevision,
\$2995, \$4495, \$6495
ColorSpace II, Mass Microsystems, \$1995
ColorSpace FX, Mass Microsystems, \$2995
Genlock Converter, Julian Systems, \$999
*Moonraker, Workstation Technologies, TBA

Video In

ColorSnap-32, Computer Friends, \$1595
FrameGrabber 324NC, RasterOps, \$1995
Neotech Image Grabber 1.8,
Advent Computer Products, \$1499
Personal Vision, Orange Micro, \$2899
PixelGrabber, Perceptics, Corporation, \$1720
ProViz Video Scanner, Pixelogic,
\$1100 black and white, \$1700 color
ProViz Video Color Converter, Pixelogic, \$595
Quick Capture, Data Translation, \$1245
Color Capture, Data Translation, \$2995

RGB and Composite Convertors

NTSC Converter for Macintosh II, Julian Systems, \$699
NTSC Converter, Orange Micro, \$799
VID/D Box (NTSC and PAL versions), Truevision, \$995, \$1995
D5-SCX Video Scan Converter, Dimension 5, \$1695

Video Out (RGB and NTSC)

ColorBoard 224, 232, 264,
RasterOps Corporation, \$3995, \$2995, \$995
SFX. RasterOps Corporation, \$1495

persuade, and communicate with people in the chaotic and competitive trade-show environment.

Now Bill Stimwich, vice president of marketing, has added Mac-based multimedia presentations to the company's portfolio. Using MacroMind Director as the basic design tool, he adds images created with Swivel 3D, Aldus Persuasion, MacDraw, and Canvas 2.0. He scans in 35mm slides with a Barneyscan color slide scanner and uses a flatbed Howtek scanner for color photographs. For certain digital-audio effects Stimwich uses MacRecorder, but the bulk of the sound track usually runs on a tape deck hidden within the booth, synchronized to the presentation running on a 37-inch monitor and a Mac II.

Stimwich's productions also include a live actor working in sync with the multimedia presentation, which runs repeatedly from five to six minutes throughout a trade show. Calling his work twenty-first-century slide shows, he uses animated effects including montages of photos, color animations, and visual magic to draw attention to his presentation subject.

For presentations projected onto screens, he feels that 8-bit color achieves the nearly photographic realism he requires. "There's nothing limiting about the Mac environment today. Right now, I can do everything I can ever imagine wanting to do, with readily available tools."

Access to Video Archives

What happens to that video clip after you've seen it on the evening news? Until very recently, at ABC News it

MULTIMEDIA ON THE NEXT

The Next machine incorporates several hardware and software features that are generating interest among multimedia developers. With its 25MHz 68030 processing unit, 8MB of RAM (expandable to 16MB), direct memory access (12 I/O processors), and digital signal processor (DSP), the Next is designed to capitalize on multimedia's need for enhanced speed, memory, data-storage, and sound capabilities.

The Next comes bundled with Mail, an electronic-mail application that lets you send voice messages over built-in Ethernet circuitry. FrameMaker, a desktop publishing program from Frame Technology Corporation, lets you add voice annotation to documents.

Developers like Metaresearch have created software and external peripherals that let users input and manipulate CD-quality sounds and

video images, taking advantage of the Next's DSP chip. Digital Ears consists of a sound utility plus hardware; it opens, plays, records, and saves sound onto SCSI disks or optical discs using a simple graphical interface. Digital Eye grabs still-video frames or sequences from laser disc players, still and full-motion video cameras, and other standard NTSC video sources. Files created with either product can then be included in documents and in other applications.

MediaStation, an application from Imagine, enables users to capture, store, and process images, animations, and sounds in an environment that allows several media to be accessed and retrieved at once. Storing data on optical discs allows visual archives, digital audio libraries, electronic storyboards, and desktop presentations to take advantage of high resolution visual and sound files.

went into storage; to see it again, you had to pay thousands of dollars for each minute of video footage. Then in late 1988 David Bohrman and his team at ABC News Interactive began publishing videodiscs for the education market.

Bohrman had been executive producer for ABC's coverage of the 1988 presidential election, so it made sense that ABC News Interactive's first release would be The '88 Vote, Cam-

paign for the White House. Subsequently, in tandem with distributor Optical Data Corporation, ABC News Interactive released the videodiscs AIDS, The Great Quake of '89, and Martin Luther King Jr. (including the entire "I Have a Dream" speech). In the works are Mission: The Moon, an overview of the Mercury, Gemini, and Apollo space flights; and The Powers That Be, a three-part project that will look at the Supreme Court, Congress,



High-End Animation

DQ-Animax, Diaquest, \$2995

*Electric Image Animation System, Electric Image, TBA
The Animation Stand, Linker Systems, \$7495



High-End Authoring

Authorware Professional, Authorware, \$8050



Videodisc Production Tools

HyperCard Videodisc Toolkit, APDA-Apple Computer, \$40
Interactive Video Design Toolkit, Electronic Vision, \$395,
enhanced version \$495

Storyboarder, American Intellware Corporation, \$495
The Voyager Video Stack 2.1, The Voyager Company, \$99.95

Voice Annotation

*Voice Navigator, Articulate Systems, TBA

*Voice Navigator XA, Articulate Systems, TBA



Videodisc Authoring

Mentor/MacVideo, Edudisc, \$695

Video Builder, Telerobotics International, \$695

Video Builder Color, Telerobotics International, \$995

Videodisc Writer, Whitney Educational Services, \$589



High-End Video Editing

AVID/1 Media Composer, AVID Technology,
\$50,000-\$85,000

Midas 1, Seehorn Technology, \$10,000

The Worx, Julian Systems, \$9995

Quicksilver Videodisc Editing System (software),
Sundance Technology Group, \$3950



*Not shipping at press time.

and the presidency.

Using HyperCard as a navigational front end, the ABC Interactive videodiscs enable teachers to create customized lesson plans that draw upon

the recorded video information. In a supportive move, Apple approved the use of its educational marketing funds for the purchase of videodisc players and monitors in schools.

Development, Distribution, and Tools

The Voyager Company is striving to create a consumer market for interactive multimedia. Its products range from educational to entertainment,

BE YOUR OWN PRODUCER

CD ROMs hold over 600MB per disc and are perfect for the distribution of multimedia applications that incorporate animations, graphics, audio, and text. For those who want to use full-motion video in their multimedia presentations, videodiscs are the preferred medium.

CD ROM pressing plants accept data on tape or hard disk. Mastering prices range from \$1500 to \$3000; replication and packaging prices depend on the total number of discs pressed. To produce from 1 to 500 discs, the price per disc starts at \$2.35. As the volume goes up, the price per disc goes down. A one-time-only disc for last-minute testing and fine-tuning, costs from \$500 to \$1000.

Videodiscs haven't had the impact on the consumer market that their cousins, VCRs, have, but they do offer high-resolution pictures and CD-quality sound. In addition, you can access the information on a videodisc in a random manner, and the disc doesn't wear out. Authoring systems such as HyperCard and SuperCard control the access to specific frames or sequences.

Consumer versus Industrial

There are two kinds of videodisc players on the market. Consumer-level players are generally priced from \$400 to \$2000 and are designed primarily for viewing movies and listening to audio CDs. Industrial-level players, starting at \$1000, have access times three to four times faster than consumer-level players. They also have an RS-232C port for interfacing with a computer, and an internal microprocessor that allows programmed control of the videodisc.

CLV versus CAV

Videodiscs can be recorded in two different ways. The CLV (constant linear

velocity) format provides up to 60 minutes per side of straight play on a 12-inch videodisc but has limited interactive capabilities. You don't have random access to the material (except on the most expensive industrial-level players), and you can't freeze frames or view material in slow motion, although you can still scan through the material sequentially and access it by chapter.

In contrast, CAV (constant angular velocity) format provides only half the storage capacity—30 minutes of full-motion video per side of a 12-inch disc—but it does offer interactivity. Depending on the player you're using, you can randomly access any of the 54,000 frames per side, view material in fast or slow motion, step through frames backwards or forwards one frame at a time, or freeze single frames. Because of this interactive capability, most computer-based multimedia applications use the CAV format.

Both CLV and CAV offer dual audio channels of 30 minutes per side, allowing you to record two audio tracks for the same video sequence. You can have narration in two languages or at two levels of difficulty, for instance, without having to rerecord identical video tracks.

Interactive Programming

There are three levels of interactivity available to videodisc producers.

Level I lets you place automatic stops and chapters in your material during mastering. User interaction is limited to playing and searching for material using these markers, and input is usually limited to a remote-control device. Level I disks are meant to be played on standard consumer-level players.

Level II contains programming, located in one or more segments of the

second audio channel, that controls the videodisc. The data is preloaded into the videodisc player's memory. Normally Level II programming requires the use of an industrial player.

Level III videodiscs are completely controlled by an external computer. All the data necessary to do this is loaded into the computer from another source, not encoded on the videodisc itself. Since a computer is controlling the play, more-sophisticated levels of programming control video playback and user interaction. Level III allows more flexibility in programming, since the controlling information is not pressed onto the videodisc.

Production Costs

While the main cost of any videodisc production is in scripting, shooting, and editing, the following is a list of the major postproduction costs.

Premastering You must deliver your material to a videodisc production facility on professional-quality videotape. This necessitates the use of a postproduction facility where, at the very least, you transfer your videotape to a 1-inch or 3/4-inch master at a cost ranging from \$150 to \$400 per hour.

Producing a check disc A one-time-only copy of your material for use in development of the final version, or for limited distribution, costs from \$300 to \$750 dollars, depending on your choice of a glass or plastic disc and of the manufacturing plant.

Mastering the disc Transferring your data to a glass master costs from \$1800 to \$7000 depending on turnaround time (faster costs more) and interactivity level (Level II costs more).

Replicating the disc Stamping out multiple copies of a mastered disc costs from \$9 to \$21 per side, depending on the total number of copies.

•
•
•
•
•
•

Multimedia

is not just a buzzword

•
•
•
•
•
•

or a set of products

from videodisc based to CD-audio based. Categorizing itself as analogous to a book publisher, Voyager adds supplementary material to videos and other work brought in from around the world, generates its own video productions, and distributes its own and others' works.

Voyager also sells videodisc and CD ROM drivers that can be converted to SuperCard, and the company supports videodisc models that the Apple-supplied drivers don't. Voyager sells The Box as well, an external device that provides computer control over some models of consumer videodisc players, enabling consumers to play interactive multimedia on the same player they bought to play movies.

Voyager's in-house staff of artists, writers, video producers, graphic artists, and HyperCard scripters collaborate with recognized authorities in specialized fields such as music or art history to produce the informative, visually appealing, and comprehensive products for which the company is known.

But making the products is one task, distributing them is another. Not yet comfortably positioned in computer software stores, video rental outlets, bookstores, or record stores, Voyager sells some of its titles in videodisc stores and most of them through direct sales. Voyager would like to see a new kind of store emerge, where you could buy multimedia hardware and software in one convenient place.

Another pioneer in the multimedia market is Warner New Media, which is producing innovative CD-audio and CD ROM products, including a three-CD set on Mozart's *The Magic Flute*.

Is It Realistic Yet?

Multimedia is not just a buzzword or a set of products. It isn't even really an emerging market niche. Rather, it is

the convergence of many new, and some not so new, technologies that promise to work together in new and meaningful ways. Multimedia promises to enrich our computing environment and bring multisensory, nonlinear approaches to our work and play. It is expensive, demanding, and potentially rewarding. The appropriate question may not be "Is multimedia real?" but rather, "Is it realistic?"

Until optical read-write technology is easily affordable and technically reliable and real-time schemes for compression and decompression of video become feasible, the storage and transportation of multimedia documents will continue to present problems. One frame of digitized full-motion video, after all, currently takes up 700K of space. Because full-motion video requires 30 frames per second, digitized video on the desktop remains unrealistic.

The amount of disk space and RAM a sound file takes up depends upon the sampling rate that it was recorded at. The sampling rate reflects the number of digital "snapshots" taken of a sound in one second. The higher the sampling rate used, the more room the recording will take up, and the higher the quality of the recording.

Eight-bit sound, adequate for

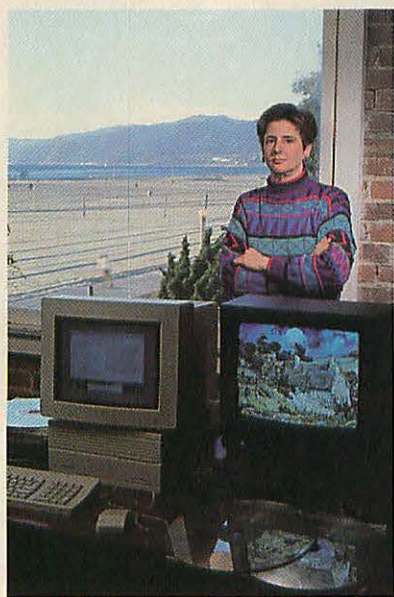
speech and some sound effects, requires up to 22K of RAM per second to play. CD-quality sound, in which 16 bits are assigned to each sample, is ideal for music and high-quality effects, but needs up to 85K of RAM per second. Until recently, these storage requirements have made it difficult to add more than brief sound bites to presentations. New software compression schemes now make it possible to compress sound files for storage, but they do degrade the quality of the recording on playback. The Audiomedia board from Digidesign uses a DSP chip and specialized driver software that allow real-time playback of CD-quality sound from a hard disk, making the Mac competitive with the Next machine in audio processing, and making it feasible for desktop developers to include long sound sequences in multimedia documents.

But even if you've digitized still frames of your videos and only used snippets of sound to save disk space, a five-minute multimedia presentation incorporating 3-D animation and 8-bit color could easily take up several megabytes. Traveling with your presentation means lugging an expensive and fragile hard disk around or investing in a removable system.

Worse still, if you want to show your presentation to more than a few people, you're going to have to spend the money to transfer it to videotape and rent either an expensive video-projection unit or a 37-inch monitor. Either way, you have to decide whether the increased interactivity, animation, and sound really make the added cost and setup time worth it.

Multimedia, however, *is* the wave of the computing future. The speed, storage, and price constraints that currently limit multimedia productions will largely evaporate as the technology evolves. While the task of producing full-fledged multimedia productions will continue to fall to dedicated developers, more and more individuals within the education, training, and business fields will undoubtedly invest the time and money to create lower-end multimedia presentations that will assist them in communicating with and persuading their target audiences. ■

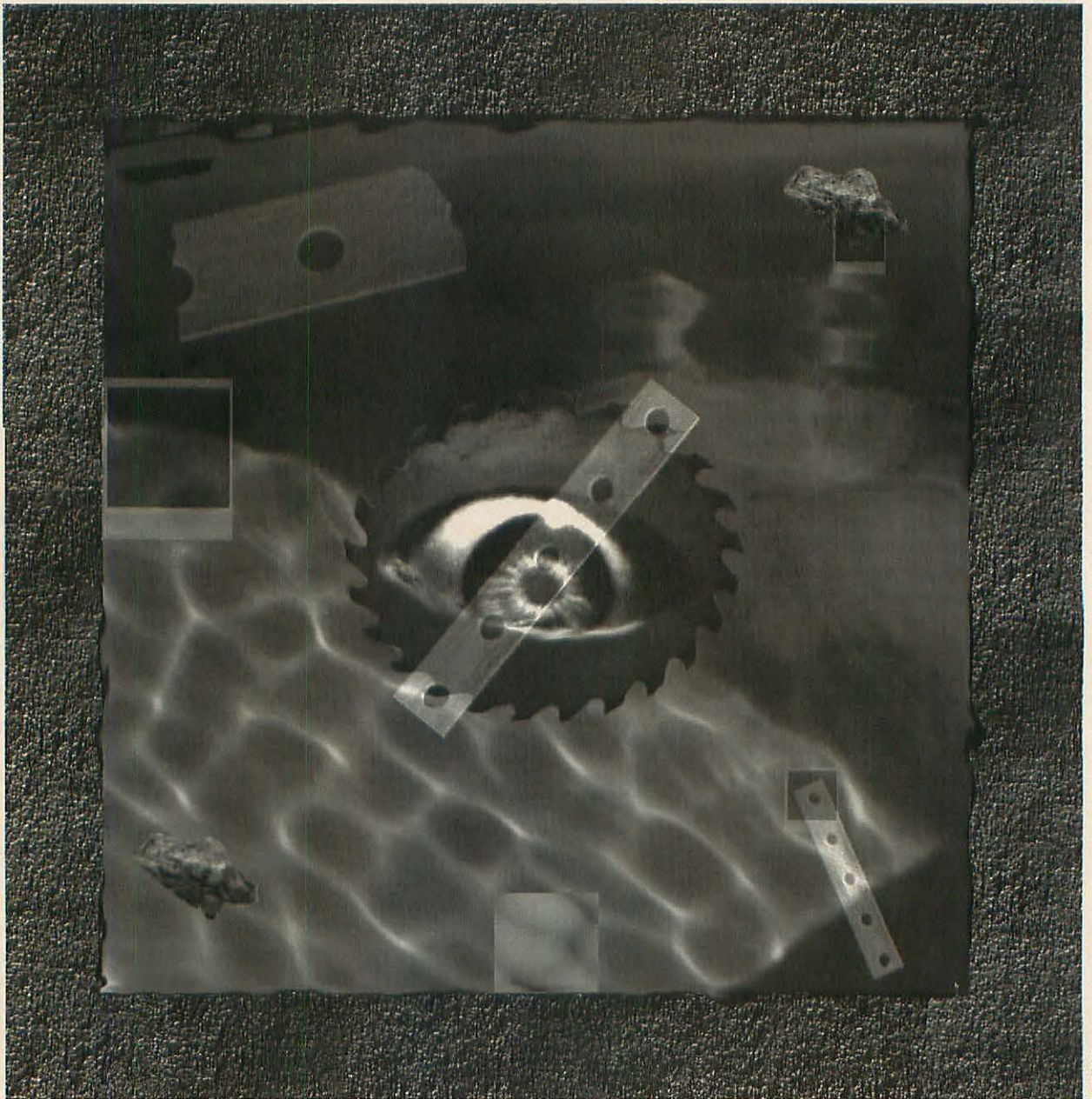
See *Where to Buy* for contact information.



Publisher Jane Wheeler of The Voyager Company recognizes that distribution is a crucial link in the development of a multimedia market.

RUSS WIDSTROM

Gray-Scale



JOHN HERSEY

Contrasts

So you want to start using gray-scale scans for desktop publishing. You want to place black-and-white images directly in electronic page layouts and then print negatives on an imagesetter or laser printer. You want to speed up turnarounds while cutting stat-house and stripping bills. You want creative control: the power to paste birds into the sky, turn up the contrast till afternoon looks like sunset, paint out that telephone pole sprouting from the company president's head.

Provided the work you do is appropriate (see "What Exactly Is This Stuff Good For, Anyway?"), you can do all these things, and more. But to do them well, to do them economically, and to have any fun in the process, you'll need to get the right image-manipulation software.

For years now buying a gray-scale program has been, as we say in the computer game, a binary decision: Digital Darkroom, from Silicon Beach, or Letraset's ImageStudio. Recently two new programs have entered the picture, bringing with them powerful capabilities. One of the newcomers, Enhance, from MicroFrontier, will appeal to people who do technical image analysis as well as to publishers and artists.



New gray-scale programs broaden the range of offerings, but sharp contrasts make for black-and-white decisions

The other, Blue Solutions' PhotoPress, bills itself as a tool for no-nonsense production. This article compares all four of these programs to see which does what best.

For some people at either the high or the low end of Mac halftoning, the right software won't be a gray-scale program, or a commercial gray-scale program, at all, and we'll look at some other options worth considering. But first let's compare the old standbys to the digital debutants to see how gracefully the gray-scale graybeards have aged.

Digital Darkroom

Digital Darkroom is a reasonably flexible, well-designed program. It offers some powerful features that until recently were uniquely its own. The interface is convenient and the manual is the best of those under review.

For the most part Digital Darkroom includes the same basic halftoning, retouching, and brightness and contrast controls as its forebear and longtime competitor, ImageStudio (see "Dots Nice!"). Some notable departures, however, do Digital Darkroom credit. Among the program's most powerful features are its Image and Paste controls, which enable you to re-

BY JOE MATAZZONI

strict the gray values that will be affected by painting, filtering, and even pasting operations.

The Image Controls work with the paint brushes and some of the filters, such as Sharpen and Blur. Suppose, for example, you have a picture with a relatively light sky and a foreground made up of darker shades. The Image Controls enable you to restrict touch-up tools so that you can paint clouds in the sky without affecting the mountains that form the horizon.

The Paste Controls work on a similar principle but include features useful in cut-and-paste work (see "Paste If"). In the example just cited, the Paste Controls could enable you to specify that pastes replace only the sky shades. You could then forget about painting clouds and simply drop in a dramatic sunset behind your mountains.

In the retouching department, Digital Darkroom's Stamp, which permits you to pick up a small section of an image and paint with it, is particularly useful. Photographs rarely contain smooth tones, and without this or a similar tool, touched up areas can look unnaturally flat. The only problem with Stamp is that the sampling area is severely limited; if you're not careful when using it to paint an area larger than the sample, the repeating stamp produces a grid pattern.

Digital Darkroom was the first Mac program to offer an autoselect feature—which searches for the edges of zones with similar gray values, so you can select objects in a picture without manually lassoing them. And it's still the only gray-scale program with an autotrace feature, which outlines ob-

jects and exports the outlines as Adobe Illustrator files.

Unfortunately, despite its many strengths, Digital Darkroom is a program in need of a major upgrade. It competes with ImageStudio, particularly since it has a \$100 price edge, but doesn't have what it takes to keep up with today's graphics programs (see "Gray-Scale Features").

Digital Darkroom's biggest limitation is that it's just not designed for the large files that 8-bit scans often yield. It's OK for working with 4-bit files or images destined for a laser printer. But for files larger than 750K or so—about the size of a 5-by-7-inch, 120-dots-per-inch, 8-bit scan—program speed slows to a crawl. You find yourself waiting around for tools to come back, while the screen labori-

ously refreshes. And the program has a tendency to crash.

Even if you're not going to use large files, you still have to have a lot of RAM to use Digital Darkroom. I tested these programs on a machine with 5 megabytes, and I wouldn't recommend that anyone do much real work in any gray-scale program without at least 4MB (8MB would be better). Still, the fact is that it's possible to work in ImageStudio with only 2MB.

Digital Darkroom holds everything in RAM, and it stores copies of the image in buffers in order to provide three levels of Undo. These buffers give the program its nice, interactive feeling, but they also eat up memory, the lack of which causes various program features not to function. To use all of Digital Darkroom's features re-

WHAT EXACTLY IS THIS STUFF GOOD FOR, ANYWAY?

If you have a quality, glossy publication and want to use Mac gray-scale scans to cut down your stat-house bills, forget it. In the first place, I've never seen a side-by-side quality comparison between Mac and conventional halftones where the former looked better. And secondly, black-and-white halftones aren't that expensive; any money you might save on stripping and stat fees will probably be offset by the value of the time you've put into doing everything yourself.

If your work fits some or all of the following descriptions, however, digital halftoning can pay off.

- Your quality demands are moderate. Gray-scale scanning is a good application for newspapers, for example, where paper quality and halftone resolution are low. The *New York Times* uses scanned photographs "almost every day" in editorial illustrations, according to Rich Meislin, head of the graphics department.
- You want control over creative effects, such as cutting images from backgrounds or making double exposures. A typical application would be ad design. If you do ads for newspapers or other medium-quality purposes, you can do everything in-house, cut costs by saving on stripping and services like airbrushing or mask cutting, and probably shave your deadlines.
- You have a need for accurate, impressive mock-ups.
- You regularly work with damaged, amateur, or other poor-quality photographs. Gray-scale editors are superb at retouching blemishes and tears, and can do a lot to fix poorly exposed or printed pictures (see "Touch-up Tester").
- You don't require large sizes at high resolutions. Even with a beefy system, this isn't practical.
- A scanner can be a cost-cutting production tool even if you don't need creative effects—especially if the publication uses many photographs, quality is moderate, and you have more time than money.

For more insights on when scanning is and isn't appropriate, see "A Halftone Handbook," *Macworld*, October 1988.



Paste If

Digital Darkroom's Paste Controls enable you to protect parts of the source or target images during pastes. In this example, the white portions of the Target bar indicate that pastes will not affect light areas in the target image. The line cutting across the graduated bar moves to reflect sampled values in the on-screen image, helping you to pinpoint values for masking. The Darken, Lighten, Blend, and Dissolve options provide control over the relative brightness of source and target images and also enable you to produce double exposures.

quires RAM equaling *four times* the size of the file, in addition to the size of the program (about 450K). So with 2MB free, you'd fall short if you tried to rotate a 500K file (rotation being a memory-intensive operation).

ImageStudio

ImageStudio was the first Mac gray-scale program. It was ahead of its time, unique—but that was then. Now Letraset, which has evidently been concentrating its energies on ColorStudio, hasn't upgraded the original in almost two years, and at this point there are only a few reasons for considering ImageStudio.

The program's gray-scale touch-up tools are very good (see "Batmoon"). Numerous controls that work with the fingertip (smudge), water drop (blur), charcoal (lighten, darken), and paint-brush tools enable you to change their responses in useful ways (see "State Your Preference"). ImageStudio is the only gray-scale program that lets you create new brush shapes and save them. To make things even more flexible, you can create your own tools: take a custom brush shape, give it the characteristics of a given tool (the rubber stamp, for example, which can



Batmoon

ImageStudio's touch-up tools are so fast and flexible that artists such as Pepe Moreno (who won first place for illustration in *Macworld's* art contest last year) have used it as a black-and-white paint package, later colorizing their images in other software.

From *Digital Justice*, © DC Comics 1990

GRAY-SCALE FEATURES

	ImageStudio 1.5	Digital Darkroom 1.1	Enhance 1.0	PhotoPress 1.0	Image 1.22
Price	\$495	\$395	\$375	\$295	free
Minimum requirement	Mac Plus	Mac Plus	Mac II, 2 MB	SE/30 with 8-bit card, 2M	SE/30 with 8-bit card, 2MB
Limited by RAM or disk	disk	RAM	RAM	RAM	RAM
Shades displayed	102	128	256	256	256
Opens multiple files	○	○	●	●	●
Autoscroll	○	●	●	○	○
Text tool	○	○	●	●	●
Colorization features	○	○	●	●	●
Save: PICT/ EPS/TIFF	●/●/●	●/●/●	●/●/●	●/○/●	●/○/●
MacPaint/Compressed	●/●	●/●	○/○	○/○	○/○
Set print angle/frequency	●/●	●/●	●/●	○/●	○/●
Save angle/frequency	EPS only	○	○	○	○
Revert to Saved	RIFF only	PICT only	●	●	●
Number of zoom levels	9	6	11	8 ¹	8 ¹
GRAY-SCALE EDITING					
Bright, contrast sliders	●	●	●	●	●
Interactive gray-map graph	●	●	●	▶ ²	▶ ²
Alter selection only	●	○	●	●	●
Histogram/line profile	○/○	▶ ³ /○	●/●	○/●	●/●
SELECTING AND TRACING					
Autoselect/set sensitivity	○/○	●/▶ ⁴	●/●	▶ ⁵ /●	▶ ⁵ /●
Edit selections	▶ ⁶	●	●	●	●
Adobe Illustrator Autotrace	○	●	○	○	○
Masking buffer	○	○	●	▶ ⁷	▶
Circle/square/polygon	○/●/●	●/●/●	●/●/●	●/●/●	●/●/●
CUT AND PASTE					
Blend images/control fade	▶/▶ ⁸	●/●	●/●	●/○	●/○
Paste-if controls	○ ⁹	●	●	○	○
Pastes scaled to fit selection	●	●	●	○	○
PAINT AND RETOUCHING					
Brush and airbrush	●	●	●	●	●
Create new brush shape	●	○	○	○	○
Control brush fade	●	○	●	○	○
Lighten and darken tools	●	●	●	○	○
Smudge/blur/sharpen tools	●/●/○	●/●/●	●/●/○	○/○/○	○/○/○
Set tool-response levels	●	▶	●	○	○
Fill graduate	●	○	●	○	○
Arbitrary orientation	●	○	○	○	○
Set Paint Bucket tolerance	▶	○	●	○	○
Graphic primitives	○	▶	●	▶	▶
Texture paint	○	●	○	○	○
Define custom fill	●	○	○	○	○
Paint only on selected grays	▶	●	●	○	○
EFFECTS					
Number of filters (approx.)	9	26	75	25	16
Manually/numerically rotate	▶/▶ ¹⁰	●/●	●/●	○/▶ ¹⁰	○/▶ ¹⁰
Apply to irregular selections	▶	●	●	▶	▶
Scale selection	▶ ¹¹	●	●	▶ ¹⁰	▶ ¹⁰
Stretch/distort/skew	○/○/○	●/●/●	●/●/●	●/○/○	●/○/○
Rotate image	●	▶ ¹¹	▶ ¹¹	▶ ¹¹	▶ ¹¹

A ▶ indicates that a program includes the feature in question, but that it isn't well implemented or is limited in some way.

¹ No zoom out.

² Linear corrections only.

³ No numeric data.

⁴ Repeating command widens selection.

⁵ Contiguous areas only; no adding to selection.

⁶ Can't add to or subtract from rectangle.

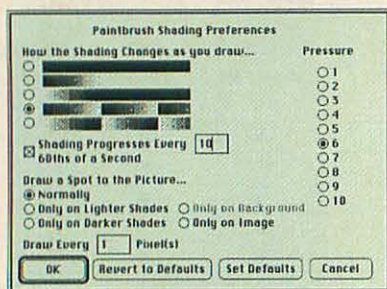
⁷ Save/Restore Selection marquee provides many functions of masking. Feature not operational with version 1 of PhotoPress.

⁸ Through Effects module; rectangular selections only.

⁹ Will ignore shade set as Background.

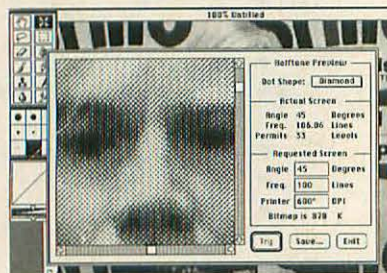
¹⁰ Rectangular selections only.

¹¹ Window doesn't rotate with image.



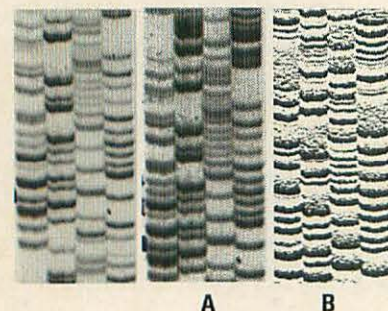
State Your Preference

ImageStudio offers a Shading Preferences dialog for all its paint tools. Pressure controls the cycling interval of the fade-out brush options on the left, as well as the response of the smudge tool and charcoal. Shading Progresses Every — 60th of a Second controls a tool's flow (how fast a spot builds up). Draw a Spot to the Picture provides you with four options for crude gray masking. And Draw Every — Pixels causes the brush to work intermittently, which is nice for making patterns.



Dots Nice!

ImageStudio's Halftone Preview calculates available angles, frequencies, and gray levels at a given printer resolution. At left, note the standard tools, including the gray-map graph (bottom). Editing the diagonal line changes the relationship of input values to output values.



Bio Bar Code

Biologists such as *Macworld* contributing editor Charles Seiter use gray-scale software to help analyze X rays of DNA. For a clear reading, the film should look almost like a set of bar codes. Here, Enhance's Histogram Equalization (A) and Heavy Shadowing (B) filters make individual bands on the film stand out.

paint transparently), select the other preferences you want (such as shading and pressure), and save your choices as a new tool.

For some users, ImageStudio's strongest selling point is its virtual memory, which enables it to function within the confines of modest systems. Some people dispute that Letraset's scheme is true virtual memory (virtually virtual?), but in any case it allows you to substitute hard disk space for RAM when opening large files. Thus, if you're working on files of up to 1MB, ImageStudio is the only program that will enable you to get by with just 2MB of RAM, though you won't get full image undo. The system works well. When running under virtual, it's possible to make gray-scale and other overall changes on an entire image. Only a slice of the image as large as available RAM is visible for pixel editing, but there's a convenient mechanism for changing slices.

The real question is how long virtual memory will continue to be a unique advantage for ImageStudio. Apple has announced that System 7.0—which was due, last I heard, in late spring—will include virtual-memory features. This theoretically means that all programs—or at least all that have followed Apple's programming guidelines—will be able to work on large files. We'll see.

In an attempt to pump some new life into this product, Letraset has produced an Effects Module that comes free with ImageStudio now but costs \$99 for those who bought the program before August 1989. This module fills some obvious holes, such as the inability to scale or rotate selections, but the effects in the beta version I looked at aren't as flexible as similar features built into other programs. Scale and rotate, for example, work only with rectangular selections. Effects does include a clever halftone-preview utility that should be standard in all gray-scale programs' printing dialogs (see "Dots Nice!").

Enhance

Well, I can't hold back any longer. Enhance is, simply, the only true second-generation gray-scale program. It does many things the others can't, and what the others can do, Enhance

can—for the most part—do better. It's a program with great parts, but its real strength is that all the parts work together to accomplish things no other Mac (or DOS, for that matter) gray-scale program is capable of doing.

I'm told Enhance started out in life as a technical image-analysis and -enhancement program, and if you're doing that kind of work don't even consider any of these other packages. In fact, according to contributing editor and molecular biologist Charles Seiter, whose day job involves enhancing autoradiograms, Enhance beats out Mac and IBM PC image-analysis programs that cost many times its price (see "Bio Bar Code"). But this technical bent shouldn't put off artists and publishers.

Both technical users and artists will appreciate Enhance's powerful image-masking features, for example. To work with just one part or even one tonal range of an image, you duplicate the image, select the part or values you want to work on, and fill the selection with black. This duplicate can now be a mask. Bring up Image Masking, and all painting, filtering, and gray-scale operations will affect only the black regions in the active mask (see "Paint It Black").

Enhance is the only program with masking buffers, but what makes its masking abilities especially useful are the program's unequaled tools for isolating and selecting just about whatever parts of an image you might want to mask. Enhance has two types of autoselect lassos (one shrinks to fit, the other expands like a typical magic wand); and you can precisely set the tolerance of both by telling them how many gray values above and below the touch point to include in the selection. You can also set an absolute threshold for selection—everything above or below value 100, say. Enhance's half-dozen brightness and contrast tools enable you to isolate a given gray value with relative ease. The Threshold tool, for example, has sliders that let you isolate a particular value or range in an image. Clicking on a button brings up a palette from which you can select any value—including black or even a color—to substitute for the selected range.

The rest of the brightness and con-

trast tools enable you to adjust an image's gray values much more precisely than do the gray-scale features in Digital Darkroom and ImageStudio (though Enhance also duplicates their controls). Particularly nice is the gamma filter, which lightens or darkens an image without chopping off the lows or highs. Moving the slider up or down gives you the same effect you would achieve if you could go into ImageStudio's or Digital Darkroom's gray-map graphs and keep drawing successively deeper smooth curves.

Just as the selection and gray-scale tools work hand-in-hand with the masking features, Enhance's gray-scale editors in turn are augmented by its histogram. Unlike Digital Darkroom's histogram, which provides a plot but no data, Enhance's histogram not only plots the distribution of values in an image but also displays numeric data about such things as the high, low, and mean values. A readout like this may seem superfluous—until you've used one. A histogram can be very useful when you're trying to identify and correct image problems. The histogram updates after filtering to show exactly how an operation changed the image (see "I Don't Know if It's Art, but I Know How Dark It Is").

Enhance's ruler is another of its simple but synergistic features. The ruler calculates the locations of points, the lengths of lines, and the angle between any two lines. Not too impressive. But add the program's ability to compare ruler information from one window with ruler information in another, and to use ruler information to control operations such as scale, rotate, and translate (move), and you start to see the possibilities.

Suppose you want to compare two aerial photographs of your town to see how it has changed in the last ten years, but the photographs were taken from different locations or different altitudes. No problem. Just load both images into memory in split-screen mode and then stretch ruler lines from First to Main streets in both windows. Now you can tell the program to scale the photographs so that the lines are the same size and to rotate the images till they have the same orientation. You could set points on the statue of George Washington in the

park, use the Translate command to align the photographs, and superimpose the new town over the old.

If you know the size of something in town, you can calibrate the images to that known quantity in any unit from microns to miles, and measure, say, the town's changing width over the years. You can calibrate the ruler so that it reads distances relative to any point you set, and you can even change the coordinate system so that it displays x and y coordinates according to four different orientations (top left to lower right, lower left to upper right, and so on).

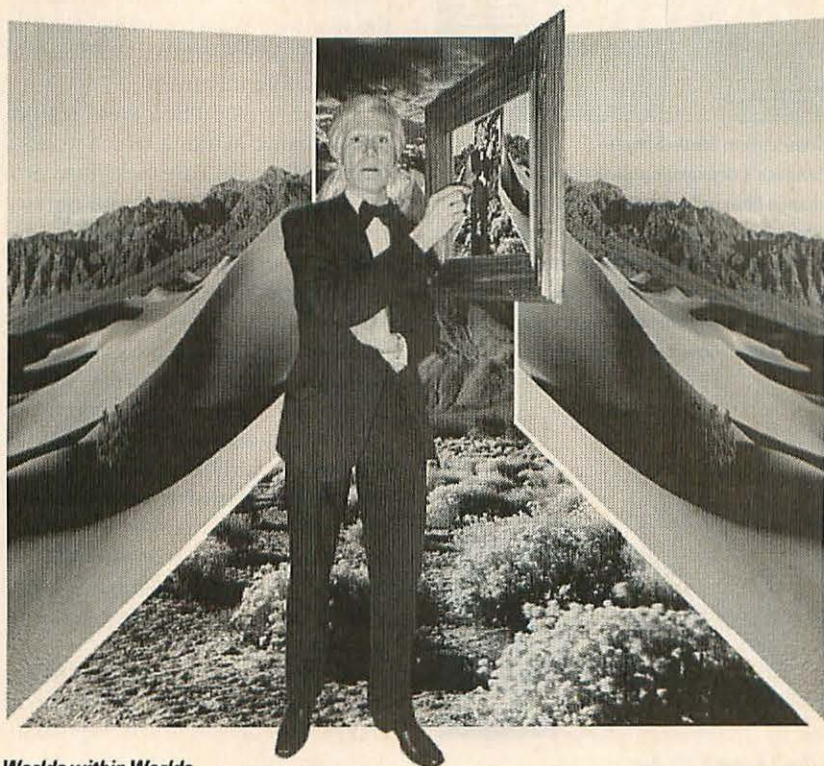
Technical users who like Enhance's ability to compare and measure image elements will be even more impressed by its filtering features. Enhance comes with a selection of about 70 to 80 filters (depending on how you count them). But if those aren't enough, the program has a

unique dialog box that enables you to easily modify any of the filters or create new ones (see "Convolution Made Simple").

The prime advantage of developing a second-generation program is that you get to steal the best from everyone and then improve on it. That about characterizes Enhance's interface, which is filled with those nice touches that make a program a pleasure to use. Enhance has an excellent selection of tools, general operation is fast and clean, and the program is less expensive than either ImageStudio or Digital Darkroom.

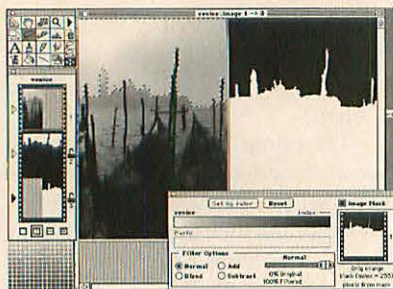
PhotoPress

I agree wholeheartedly with Blue Solutions' gray-scale strategy. The idea was to produce an easy-to-use program at a reasonable price for the vast majority of potential gray-scale publishers who will never create photo



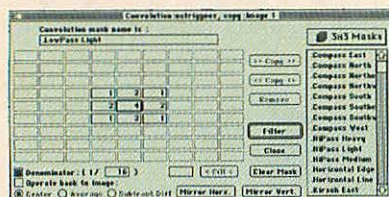
Worlds within Worlds

San Francisco illustrator Keith Baumann created this collage to help evaluate the programs under review. Because Enhance's skewing features produced curved edges, Baumann distorted the side and bottom panels using Digital Darkroom. He finished the rest of the job in Enhance, using features like autoselect (to remove Andy from his original background), smudge (to smooth the figure into its new surroundings), and various sharpening and brightness and contrast filters (to correct for blurriness resulting from scaling and skewing and to match the different images' values to each other). Since the inside of the picture frame was originally white, Baumann was able to crop the skewed, miniature image automatically using the Paste If controls (pasting only to white).



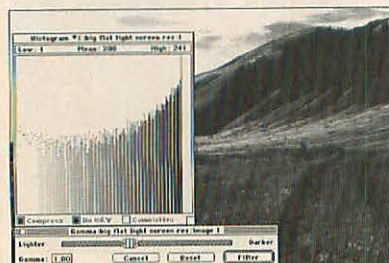
Paint It Black

In Enhance, anything you can make black can be a mask. Here, the icon views at left show that masks have been created to isolate the foreground and sky. The dialog box (bottom) indicates that buffer 3 is the active mask channel, meaning that changes can now be made only to the sky. The controls on the left of the dialog box duplicate Digital Darkroom's gray-sensitive Paste Controls (see "Paste It").



Convolution Made Simple

Enhance's Convolution mask lets you easily change filter parameters or make entirely new filters. The Copy button loads the parameters for any of the program's filters into the mask grid and associated control boxes. You then simply make any changes you want and copy the renamed filter back to the menu.



I Don't Know If It's Art, but I Know How Dark It Is

Enhance's histogram can help to identify problems in a picture. In this example, the image is obviously dark (note the high mean value), but the darkest value is level 241, which means the scan contains no true black (level 256). The Gamma filter at bottom can be used to correct both flaws.

collages with double exposures and otherworldly filter effects. Offer a simple, moderately priced program with only the most useful features and nothing to confuse and scanner owners will beat a path to your door.

Unfortunately, the path to Blue Solutions' door is liable to remain relatively untrodden. Strategy has to be backed up by good tactical decisions, and this program embodies too many poor choices for me to recommend it, despite its price advantage.

PhotoPress does have a few things going for it. Like Enhance but unlike Digital Darkroom and ImageStudio, PhotoPress displays a full 256 gray values on screen. Most of the time this doesn't matter, but seeing exactly what's going on instead of getting a display that shows every other shade can be a big plus for detailed touch-up work. PhotoPress's most sophisticated feature is an option that saves selection marquees for later use. When I wrote this, the command to restore the marquee wasn't working, but the company promised that a fix would be out before this article.

Another nice PhotoPress feature is its Dynamic Masking, which works a bit like Enhance's Threshold filter, providing visual feedback so you can isolate a value or range of values precisely. When used with the magic wand, Dynamic Masking gives the same effect as an adjustable autoselect tool. Well, almost the same effect; Dynamic Masking with the magic wand is great at selecting one region, but you can't autoselect noncontiguous regions—a fairly common thing to want to do. PhotoPress has colorization features, and comes with some predefined palettes that turn a black-and-white photograph into a sepia or a duotone print (Enhance offers this as well).

So what can't PhotoPress do? For one thing, it doesn't offer very good control over gray values. It comes with a gray-map graph and sliders that look like the ones in ImageStudio and Digital Darkroom, but you can't draw curves on the graph, you can only slide the straight line around. PhotoPress comes with an automatic contrast-correction filter, but it's a canned, hit-and-miss proposition.

In the touch-up department,

PhotoPress lacks some of the other programs' most useful tools. Missing are smudge, lighten and darken (charcoal), as well as blur, which is key since it makes manual antialiasing possible. The paintbrush paints with any shape you want as long as it's a circle (albeit a circle of any size).

When it comes to printing options, PhotoPress offers only two halftone screen angles: 45 and 90 degrees. Big deal, you say, who prints at nonstandard angles? Answer: people who want optimal results from a laser printer. PostScript printers require nonstandard angles to be able to print at many frequencies. By limiting you to two halftone angles, PhotoPress drastically reduces the frequencies available on 300-dpi printers. So forget about trying different frequencies to get just the right trade-off of gray values and resolution.

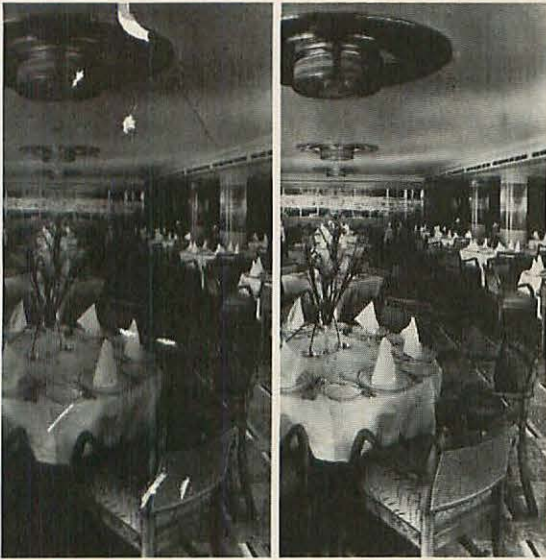
PhotoPress is the only gray-scale program that thinks about image size solely in pixels. For example, it has a ruler feature, which is a nice thought, but why couldn't the program divide by 72 to give you measurements in inches? The Mac is a computer—it's supposed to compute things.

As part of this 72-dpi myopia, PhotoPress completely ignores all files' source resolution and sizing, indifferently treating all scans as if they were 72-dpi. If you open a 300-dpi, 5-by-7-inch scan in PhotoPress, it comes up on screen at more than four times its original size; an information box offers that the file is a 72-dpi image (aren't they all!) of dimensions x pixels by y pixels. That wouldn't be too bad, except that PhotoPress *can't zoom out*, which means the only place you can see your entire image is in the shrink-to-fit window, where many program functions don't work. If you happen not to know a scan's original dimensions and resolution, or if you want to scale the scan to a particular size, you have to dig out the old percentage wheel and calculator—or go to another program.

Overall, PhotoPress just feels half-baked and I can't quite picture the user it would serve well.

The Big Picture

Which one should you get? The answer isn't as clear as it might seem. If



Touch-up Tester

Macworld artist and designer Arne Hurty (see cover) helped evaluate the packages under review for their touch-up capabilities. After working with all the programs, he chose Enhance to complete the project shown here, for the following reasons: (1) The interface was more convenient. "Controls are easy to understand, and accomplishing things generally takes fewer steps." Strangely enough, Enhance is the only program in which drawing tools appear at the size they draw, even in enlarged views—a simple but significant plus. (2) Hurty found the ability to see all 256 gray levels on screen "critical," since touch-ups require so much work at the individual pixel level. (3) "It's faster, and it didn't bomb."

your needs are simple, don't waste your money on any of these programs. In "Gray-Scale Features" you will notice a public-domain program called Image. The code for this software actually forms the core of PhotoPress, and the only significant advantage I can see to the latter is that it comes with an illustrated manual and phone support. Image shares many of PhotoPress's limitations, but it will enable you to open and view gray-scale files, touch-up specks and scratches, and change brightness and contrast. Since PageMaker, QuarkXPress, ReadySetGo, and DesignStudio all offer brightness and contrast control for gray-scale images, Image will probably be most useful for modest retouching. Image was designed for medical image analysis and includes a number of useful features for that purpose. You can get it virtually free from many user groups

or by logging on to CompuServe (Macpro DL14) or one of the other major services.

Silicon Beach Software has been working on a new version of Digital Darkroom, but at press time the company couldn't comment about release dates. When and if version 2.0 comes out, it will, I'm sure, be worth checking into. Another program with gray-scale features that was forthcoming at press time is Deneba's UltraPaint.

This appears to be one of those do-everything packages, but if you're in the market for a paint package anyway and your gray-scale editing needs are simple, it might also be worth a look.

If you're serious about using digital halftones for production, the choice still isn't cut-and-dried. When it comes to gray-scale software, Enhance is a hard-to-beat combination of the best program at the best price. But it may be that making the best gray-scale program today is a bit like coming up with a better turntable just when everyone is switching to CDs.

Some of the new color programs that should be on the market by the time this article comes out will have even more power than Enhance. At \$1995, ColorStudio is a bit expensive for black-and-white work. But Adobe has announced that its Photoshop will sell for \$895, and the beta version I looked at has some features that retouchers of color or black-and-white images will definitely covet.

To name a few: the ability to feather the edges of masks, which provides the essential ability to alter images without being obvious—subtly dodging a sky here or burning in a faded edge there. Photoshop also has automatic antialiasing, as well as Clone and Stamp features that work along the same lines as Digital Darkroom's Stamp but are much more flexible. For the production minded, Photoshop provides the ability to save gamma curves for later use. The graphics staff at the *New York Times* uses this fea-

ture with every Mac image they print, applying a curve they've developed that adjusts for the limited tonal range of newsprint. The list goes on.

So, turntable or CD? *Macworld* hasn't officially reviewed Photoshop and we don't usually compare beta software to shipping products. But Photoshop has been used widely enough by people I know both inside and outside *Macworld* for me to say confidently that ad designers, illustrators who use photographs, or anyone else who wants complete creative control over scans should at least look into Photoshop before they buy. If you plan to do color work anyway, there's no reason to have Enhance and an expensive color image processing program. On the other hand, Photoshop is more than twice the price of Enhance and may have other disadvantages that aren't clear at this point. If your operation is strictly black and white and you can get by without Photoshop's features, Enhance is an excellent tool.

Gray-scale editing is an appealing proposition for certain types of work. It's been my observation over the last few years, however, that although scanner sales seemed to be booming and many people had gray-scale editors, few artists or publishers were actually using the software to its potential. In part the reasons had to do with people not having the right hardware to work effectively—no gray-scale display or not enough RAM. In part it was people's resistance to learning the things about digital halftoning that they need to know to get good results. And in part it was that few Linotronic bureaus had the expertise required to produce consistent output.

But the blame also rests with the available software, which hasn't been quite powerful enough to make the effort-to-results equation pay off. Now that a new generation of more advanced image editors is emerging to complement today's more powerful hardware and the maturing service-bureau business, it will be interesting to see whether digital halftoning and photography take off, or whether this will turn out to be a technology whose time never was. ■

See *Where to Buy* for contact information.



MONOCHROME MONITOR MANIA



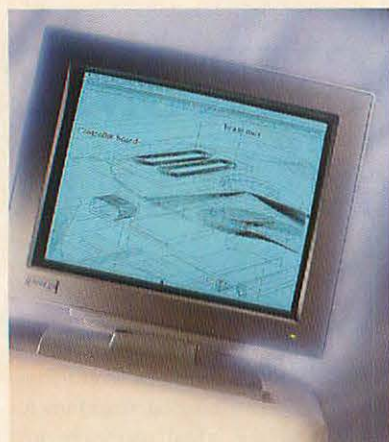
Shown from left to right are the Sigma Designs monochrome and gray-scale SilverView, the MegaGraphic MegaScreen 2001/3001 monochrome monitor, and the Radius monochrome Full Page Display.

An
obsessive
evaluation
uncovers
the best
monochrome
monitors

Each time Macworld Expo rolls around, searching for the ideal monochrome monitor goes to the top of my to-do list. But even though nearly every kind of black-and-white and gray-scale monitor is there under one or two roofs, I end up hardly more enlightened than I was before. The exhibitors rarely set several different monitors side-by-side for easy comparison, and it's almost impossible to view even a handful under uniform conditions. Some beam down at you from above, some stare you straight in the eye, and others look up from belt-buckle level. Some are hidden in the shadows while others face the harsh light of Expo reality. Few monitors at the shows display documents relevant to my kind of work, and heaven only knows if an Expo monitor's controls are set properly.

So, after years of comparing monochrome monitors at numerous Expos without success, I jumped at the chance to compare a group of them in one room, under uniform conditions, displaying the same sample documents. For this article, Macworld Labs tested 12 gray-scale and 11 black-and-white monitors. At the same time, I ran each monitor through its paces with a variety of applications, documents, and subjective tests. (Although some monitors may be used with boards from other manufacturers, all monitors for this article were tested as systems—that is, with board and monitor both coming from the same manufacturer.)

Dozens of monitors and hours of squinty-eyed testing later, I have finally identified my favorite monochrome monitors. But I've also discovered how personal and subjective the choice of a monitor can be. Therefore I can't presume that my top choices will be



RasterOps ClearVue monochrome display

yours. But I can tell you what I've learned about selecting monitors and offer a few opinions along the way.

Shades of Gray

Gray-scale monitors can display as many as 256 shades of gray, whereas a black-and-white monitor has just two: black and white. If you work with images such as scanned photographs, a gray-scale monitor is a necessity. Since many gray-scale boards, such as Super-Mac's Spectrum/8, produce 256 colors on a color monitor, gray-scale could also be considered the first step toward color. (Similarly, many black-and-white monitors can be converted

into gray-scale monitors simply by changing the board.)

Virtually all gray-scale monitors (including the Apple High Resolution Monochrome Monitor) display 256 gray shades. Apple sells two 16-gray-level monitors (the Portrait Display and the Two-Page Monochrome Monitor), because, Apple says, these monitors match the input of the Apple 16-gray-level scanner and the output of the LaserWriter family. Apple loyalists should check out these 16-shade offerings, but most everyone else will be happier with the 256 degrees of freedom provided by the competition.

Pixel Density

A pixel (short for picture element) is the smallest dot that a monitor can display; pixel density is the number of pixels per linear inch. (In Macintosh monitors, the pixel density is—or should be—the same horizontally and vertically.) Most monitors have a fixed pixel density; some, however, such as Sigma Designs' L-View and PageView and E-Machines' QuickView Z21, can switch between several different pixel densities, in much the same way my old Selectric typewriter could alternate between 10 and 12 pitch.

Macintosh Plus and SE screens have a pixel density of 72 dots per inch. So do RasterOps' ClearVue/II,

Sigma Designs' SilverView, PCPC's ShadowGraph along with many others. This pixel density is the standard by which all monitors are measured because most applications and all screen fonts are built around it. At 72 dpi, what is displayed on the screen most closely approximates the dimensions of the printed page.

Among the monitors we looked at, only Sigma Designs' L-View and E-Machines' QuickView Z21 can switch to pixel densities of less than 72 dpi. These lower densities (60 dpi and 36 or 40 dpi, respectively) create easy-on-the-eyes, larger-than-life images not unlike the large-type edition of *Reader's Digest*. On the other hand, many monitors display pixel densities higher than 72 dpi. MegaGraphics' MegaScreen 2008 has a pixel density of 75 dpi, for example, while Radius's Two Page Display System is 82 dpi, and E-Machines' The Big Picture is 85 dpi. At these densities, on-screen text, though slightly smaller, is sharper and thus easier to read. Beyond such moderate increases in pixel density, however, everyday type sizes become too small for comfort. An example is the tiny type of Sigma Designs' L-View which, in its 120-dpi mode, is just too much of a good thing (except for the CAD specialists for whom it was designed).

Issues of legibility aside, the choice of desirable pixel density revolves around the opposing forces of WYSIWYG-ness and maximum displayed page area. At 85 dpi, page dimensions on screen are appreciably smaller than the printed page. But compared to 72 dpi (or less), you can see more rows and cells in a spreadsheet, or a greater page area in a page-makeup program. If matching the screen image to the printed output is important to you, stick to 72 dpi. If you work on two-page spreads or large spreadsheets regularly, a pixel density in the 80- to 85-dpi range may allow you to see everything you need to see without scrolling.

Special SE Considerations

If you are purchasing an external monitor for an SE, you need to consider more than the pixel density, pixel dimensions, and the number of grays a monitor has. Most external moni-

PIXEL DIMENSIONS EXPLAINED

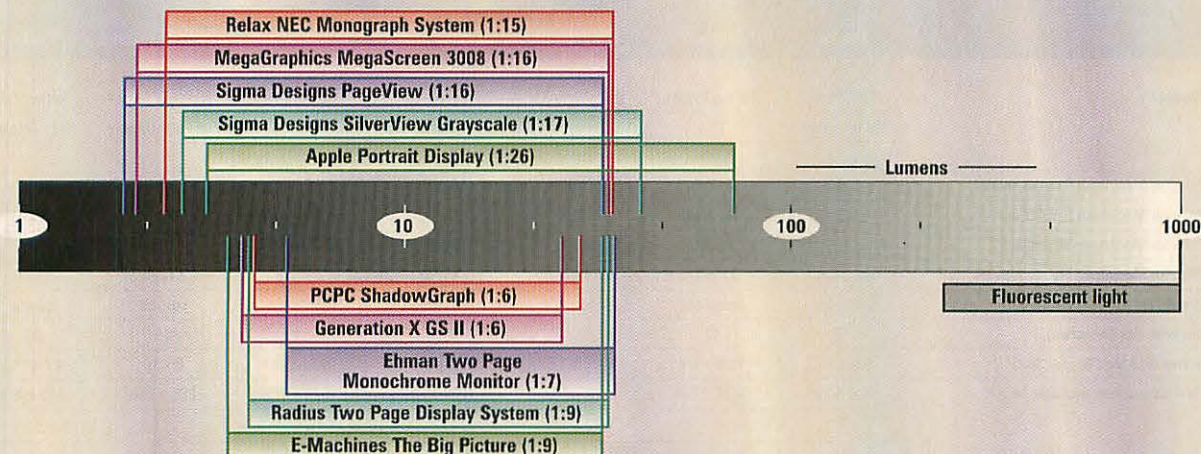
The diagonal measure of the video tube and the linear dimensions of the active area (the part of the screen that actually displays information) give a rough idea of the real estate you'll be dealing with. But it's the pixel dimensions of the active area that give a true reading of the maximum page area a monitor can display. In fact, four standard pixel dimensions are all you need to know to size up a monitor:

Pixel Dimensions	Display
640 x 860	one full page (vertical)
1024 x 770	two facing pages less about one inch top and bottom and two inches right and left
1150 x 880	two facing pages less about one inch right and left
1280 x 960	two full facing pages

A few monochrome monitors can't display even one full page. The Apple High Resolution Monochrome Monitor, at 640 by 480, and Relax's NEC Monograph System, at 768 by 767, are two examples. Choose one of these monitors only if other characteristics, such as the relatively compact size of the Apple display, heavily outweigh displayed page area in your calculations.

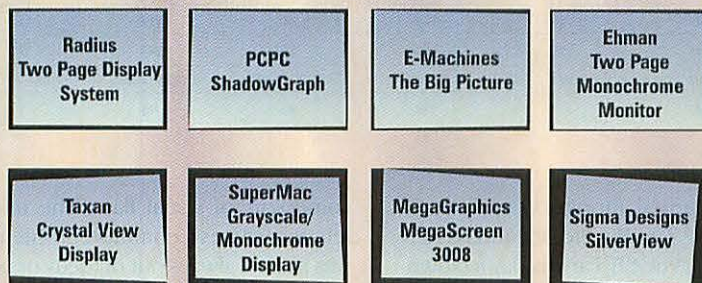
COMPARING CONTRAST

Measured in Lumens



Since contrast is the relative difference between dark and light areas, monitors with the best contrast (top) are the ones that allow the greatest range between dark and light areas. The monitors with the worst contrast have much narrower ranges (bottom). All other monitors displayed average contrast. The numbers in parentheses denote the ratio of light to dark.

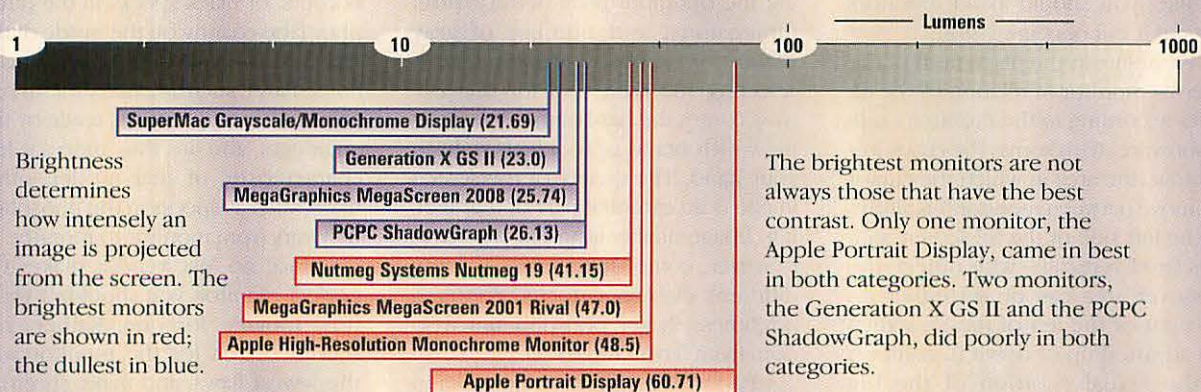
DISTORTION DISPLAYED



All of the monitors we tested showed some distortion, especially in the corners. This diagram represents the best (top) and worst (bottom) monitors. The drawings are exaggerated, but they have been rendered proportionally to what we measured on the real screen.

BRIGHTNESS

Measured in Lumens



Brightness determines how intensely an image is projected from the screen. The brightest monitors are shown in red; the dimmest in blue.

The brightest monitors are not always those that have the best contrast. Only one monitor, the Apple Portrait Display, came in best in both categories. Two monitors, the Generation X GS II and the PCPC ShadowGraph, did poorly in both categories.

BLACK-AND-WHITE MONITORS

	Ehman	E-Machines	E-Machines	MegaGraphics	Nutmeg Systems	Nutmeg Systems	Radius
Product	Two Page	The Big Picture	QuickView Z21	MegaScreen	Nutmeg 19	Nutmeg/Xerox	Radius Full
	Monochrome			2001/ 3001 Rival		Full Page Display	Page Display
Price for Macintosh II series model	\$899	\$1795	\$2495	\$1698	\$1699	\$999	\$1490
Price for Macintosh SE/30 model	\$899	not avail.	\$2495	\$1698	\$1699	\$999	\$1490
Price for Macintosh SE model	\$899	\$1695 ¹	\$2395	\$1698	\$1699	\$1299	\$1490
Price for Macintosh Plus model	not avail.		not avail.	\$1748	\$1699	\$1299	\$1490
Orientation	landscape	landscape	landscape	landscape	landscape	portrait	portrait
Diagonal size (in inches)	19	17	21	19	19	15	15
Active area (w x h, in inches)	13.9 x 10.7	11.8 x 9.3	16 x 12	13.7 x 10.7	14.2 x 10.7	8 x 10	8.3 x 11.2
Pixel dimensions available (w x h)	1024 x 769	1024 x 808	576 x 432; 640 x 480; 1152 x 864; 1280 x 960	1024 x 826	1024 x 768	606 x 760	640 x 864
Pixel density available (in dpi)	73	85	36, 40, 72, 80	75	72	72	77
Vertical refresh rate available (in Hz)	78	60	70, 76	75	78	76	69
Antiglare treatment	no	no	yes	optional	no	yes	no
Virtual screen	Stepping Out II ²	no	hardware	no	Stepping Out II	Stepping Out II	hardware
Tilt and/or swivel stand	yes	no	yes	yes	yes	yes	yes
Warranty period	1 year	1 year	1 year	1 year	1 year	1 year	1 year
Extended warranty available	yes	yes	yes	yes	no	no	no
Special features for 512K, Plus, SE series							
Can use both screens	yes	yes	yes	yes	yes	yes	yes
Can adjust cursor crossover point	no	yes	yes	yes	yes	yes	yes
Position in relation to Mac	right	left	left	right or left	right or left	right or left	right or left
Can display same image on both screens	no	yes	no	yes	no	no	no

¹ Macintosh 512K model also available. ² For Macintosh II and SE/30 only.

tors for the SE, such as the RasterOps ClearVue/SE and Taxan's Crystal View SE, can be used in tandem with the SE's screen; a few, such as Sigma Designs' L-View, turn off the SE screen. Since the SE screen is a worthwhile work area and a convenient place to park tear-off menus, tool palettes, and the like, you should avoid monitors that put it out of commission.

Flexibility in the placement of the external monitor in relation to the SE varies according to the monitor's utility software. With some, the crossover window (the area in which the cursor can move between monitors) is always on the left side of the SE screen and/or is fixed vertically; with others, the crossover area can be set either on the right or the left of the SE screen and adjusted up or down to conform to the actual position of the big monitor.

Finally, for those who want to use the larger screen for demonstrations,

some external monitors, such as E-Machines' The Big Picture and RasterOps' ClearVue/SE, can display a blown-up duplicate of the image that's on the SE screen.

The Search for Perfection

Narrowing your choices by determining the optimum pixel density, pixel dimensions, and number of gray shades for your work is equivalent to selecting the right tool for the job. Now comes the hard part—determining which brand of tool feels right in your hand. The quality of the screen image is an essential part of that feeling. Image quality is an elusive beast, however, composed as it is of many different elements: focus, contrast, brightness, flicker, phosphor tint, freedom from flaws, and so on.

Perfection might be possible in monitors, but only the Pentagon would be willing or able to pay the price. Every monitor I looked at had

some sort of visual flaw. The upper left corner was a common problem; it was almost always out of focus or bent out of shape to some degree (see "Distortion Displayed"). Some monitors displayed other flaws as well, such as squashed or fuzzy menu bars, kinks in straight lines, bowed or pinched borders, or black specks in the phosphor (the coating on the inside of the screen that creates the visual image). Some flaws, such as a fuzzy menu bar, are due to compromises made by the engineers, and are thus more or less characteristic of that model; other flaws, such as specks in the phosphor, may vary from monitor to monitor.

Since no Mac vendor makes the perfect monitor, you shouldn't waste time looking for one. Rather, you should search for the monitor with the fewest flaws, and make sure that what flaws there are won't eventually drive you crazy. I find a few black specks in the phosphor easy to over-

Radius	RasterOps	Sigma Designs	Sigma Designs	Taxan
Radius Two	ClearVue/II and SE	SilverView	PageView	Taxan Crystal View
Page Display				Display
\$1990	\$1995	\$1999	\$1399	\$1699
\$1990	not avail.	\$1999	\$1399	\$1699
\$1990	\$1995	\$1999	\$1299	\$1699
not avail.	not avail.	not avail.	not avail.	not avail.
landscape	landscape	landscape	portrait	landscape
19	19	21	15	19
14 x 10.7	13.9 x 10.4	16 x 12	8 x 10.7	14.2 x 10.7
1152 x 882	1024 x 768	1152 x 870	576 x 768;	1024 x 768
			640 x 870;	
			704 x 940	
82	72	72	72, 80, 88	72
71	72	73	80-97	78
no	no	no	optional	yes
no	no	no	no	no
yes	yes	yes	yes	yes
1 year	1 year	1 year	1 year	1 year
no	yes	no	no	yes
yes	yes	yes	yes	yes
yes	yes	no	no	no
right or left	right or left	right or left	right or left	right or left
yes	yes	no	no	no

look, while bends in what should be straight lines are maddening. Not one of the monitors I reviewed, however, had visual flaws so irritating that I ruled it out for that reason alone.

Large-screen monitors are rarely without other visual flaws, including problems with focus; edges and corners in particular are prone to fuzziness. In general, focus was uniformly excellent on the Apple displays (except for the Two-Page Monochrome Monitor) and on all the models for the Mac II by Radius, SuperMac, and RasterOps. Among the others, I found minor, and usually spotty, focus problems along the sides and the bottom, but because these areas usually contain page margins and scroll bars rather than vital information, a few fuzzy spots are acceptable. Watch out, however, for bands of fuzziness wider than 1/4 inch or so, and for fuzziness along the top of the screen. Although some people might consider it merely a cos-

metic distraction, out-of-focus menu bars—such as those found in Taxan's Crystal View and the Apple Two-Page Monochrome Monitor—can be a major visual irritant.

The Quality of the Environment

The color of your office, the position of windows, the level of ambient light, whether or not other monitors will be attached to your Mac, and other aspects of your work environment need to be factored into your final decision as well. For example, consider antiglare treatment, which is included on some monitors and not on others. If you habitually wear white shirts and work in a brightly lit room, even the best antiglare treatment may not help much. On the other hand, if you usually wear dark colors and have some control over the lighting and physical arrangement of your work area, you may not need any antiglare treatment.

In favorable conditions such as low



SuperMac Grayscale/Monochrome Display

light, antiglare treatment can enhance contrast. Under unfavorable conditions (lots of light, lots of glare), antiglare treatment can reduce contrast. Under all conditions, antiglare treatment reduces brightness and often makes the screen image appear slightly unfocused. (Turning up the brightness to compensate can put the image even more out of focus.) If your work environment permits, I recommend that you eschew antiglare treatment, or at least avoid heavy-duty treatment such as that found on the Apple Two-Page Monochrome Monitor.

No one argues with the need for good contrast (whiter whites and blacker blacks) and brightness (to avoid that washed-out look), and Macworld Labs' test results show which monitors come out on top in this regard (see "Comparing Contrast" and "Brightness"). But remember that the right brightness and contrast for one situation may be far more or far less than is needed in another. In general, if your workplace has low light levels, you won't need to crank the brightness and contrast up very high. If you use your monitor for, say, public demonstrations in brightly lit areas, you'll need all the brightness and contrast you can get.

One other point about brightness: monitors tend to decrease in brightness as time passes and the phosphor loses its youthful glow. If you buy a monitor whose brightness control can be turned up higher than you currently need, you'll be able to compensate for the monitor's inevitable senescence. If the monitor needs to be set

GRAY-SCALE MONITORS

	Apple Computer	Apple Computer	Apple Computer	E-Machines	Generation X	MegaGraphics	PCPC
Product	Portrait Display	High-Resolution	Two-Page	QuickView	GS II and GS 30	MegaScreen	ShadowGraph
		Monochrome	Monochrome	Z21 IQ		2008/3008	
		Monitor	Monitor				
Price for Macintosh II series model	\$1698 ¹	\$1047 ²	\$2748 ³	\$3495	\$1999	\$2948	\$2895
Price for Macintosh SE/30 model	not avail.	not avail.	not avail.	not avail.	\$1999	\$3198	\$3495
Price for Macintosh SE model	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.
Price for Macintosh Plus model	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.
Orientation	portrait	landscape	landscape	landscape	landscape	landscape	landscape
Diagonal size (in inches)	15	12	21	21	19	19	19
Active area (w x h, in inches)	7.8 x 11	8.4 x 6.3	15 x 11.3	16 x 12	14.2 x 10.7	13.6 x 10.7	14.2 x 10.7
Pixel dimensions available (w x h)	640 x 870	640 x 480	1152 x 870	1280 x 960	1024 x 768	1024 x 826	1024 x 768
				(at 80 dpi)			
Pixel density available (in dpi)	80	76	77	72, 80	72	75	72
Vertical refresh rate available (in Hz)	75	66.7	75	70, 76	75	69	60
Number of gray levels available	2, 4, 16	2, 4, 16, 256	2, 4, 16	2, 4, 16, 256	2, 4, 16, 256	2, 4, 16, 256	2, 4, 16, 256
Antiglare treatment	yes	yes	yes	yes	yes	optional	yes
Virtual screen	no	no	no	hardware	no	no	Stepping Out
Tilt and/or swivel stand	optional	optional	yes	yes	yes	yes	yes
Warranty period	3 months	3 months	3 months	1 year	1 year	1 year	1 year
Extended warranty available	no	no	no	yes	no	yes	no
Special features for 512K, Plus, SE series	n/a	n/a	n/a	n/a			
Can use both screens					yes	yes	yes
Can adjust cursor crossover point					no	yes	yes
Position in relation to Mac					right or left	right or left	right or left
Can display same image on both screens					no	yes	no

¹ \$1099 for Macintosh IIci (board not required).² \$399 for Macintosh IIci (board not required).³ \$2149 for Macintosh IIci (board not required).

at full brightness from the very beginning, however, there's no way you will be able to adjust it to be bright enough a year or two down the road.

Monochromatic Colors

Most phosphors for the Macintosh come in one of three different shades: blue (like Apple's monitors and the Nutmeg 19), paper white (SuperMac's Grayscale/Monochrome Display), and amber yellow (E-Machines' The Big Picture and Relax Technology's NEC Monograph system) (see "Phosphor Color"). Many Macintosh owners prefer the blue of the Mac Plus and SE screens because it is what they've grown accustomed to.

First-time monitor buyers, however, should know that people tend to find amber yellow phosphor more comfortable in incandescent light, and blue monitors more comfortable in fluorescent light. Also, if you are buying a second monitor, it's usually a good idea to stick with more or less

the same color as your original monitor. Blue and amber yellow monitors look jarringly different when sitting side-by-side.

Persistence and Surge

A phosphor's persistence is the length of time it takes the phosphor to turn off; the longer the persistence, the more likely you are to see momentary ghosts of disappearing or moving objects. All monitors ghost to some extent, but under average lighting conditions, you shouldn't be aware of it. Apple monitors have the shortest persistence; if you work with animation or live-action video, these are good choices. In our tests the longest persistence was displayed by Sigma Designs' L-View and by E-Machines' The Big Picture. The latter displayed strong, sickly yellow ghosts whenever part of the screen switched from white to black. I would avoid The Big Picture for this reason alone. All the other monitors had acceptable persistences

in between these two extremes.

All monitors also experience surge: a change in the linear dimensions of the active area, like a balloon suddenly inflating or deflating. Generally speaking, only people who perform graphics tasks involving frequent switching between largely black and largely white screens are likely to experience surge at its worst; if this describes what you do, you want to avoid monitors with high surge scores. (These include E-Machines' Z-21 and The Big Picture, MegaGraphics' 2001/3001, the Nutmeg 19, and the Radius Full Page Display.) On the other hand, I tested the Radius Full Page Display for several weeks in text-intensive work, and even though it has the worst surge-test scores, I hardly noticed the problem.

What You See Is What You Get

What you see on a monitor's screen is in some ways comparable to a motion picture; a sequence of dozens of images per second gives the impression

Radius	Relax Technology	Sigma Designs	Sigma Designs	SuperMac Technology
Radius Two	NEC Monograph	SilverView	Monochrome	Grayscale/
Page Display	System		L-View	Monochrome
				Display
\$3390	\$1995	\$2999	\$2495	\$3294
not avail.	not avail.	not avail.	\$2495	not avail.
not avail.	not avail.	not avail.	\$2395	not avail.
not avail.	not avail.	not avail.	not avail.	not avail.
landscape	square	landscape	landscape	landscape
19	16	21	19	19
14 x 10.7	10.2 x 10	16 x 12	14 x 10.1	13.9 x 10.3
1152 x 882	768 x 767	1152 x 870	1200 x 1664;	1024 x 768
			600 x 832	
82	72	72	60, 120	72
71	90	73	60	75
2, 16, 256	2, 4, 16, 256	2, 4, 16, 256	4	2, 4, 16, 256
no	yes	no	optional	yes
no	no	no	no	hardware
yes	yes	yes	yes	yes
1 year	1 year	1 year	1 year	1 year
no	no	no	no	no
n/a	n/a	n/a		n/a
			no	
			no	
			right or left	
			no	

of a rock-solid display. The rate at which those images are flashed on the screen is called the vertical refresh rate; a rate of 74Hz, for example, means that 74 images per second are painted on the screen. If the refresh rate is too low, below 60Hz, the screen will seem to flicker, like an old-time movie. Above 65Hz, most people will see a steady screen without any flicker. What you see at rates between 60Hz and 65Hz depends on the acuity of your vision.

Screen flicker is, at best, a strain on the eyes and, at worst, a form of information-age torture. Nowadays, most monitors have refresh rates above 70Hz. But low-refresh-rate monitors do still exist, and you should reject them if you detect flicker. E-Machines' The Big Picture, PCPC's ShadowGraph, and Sigma Designs' L-View all have refresh rates of 60Hz, for example, and I detected enough flicker in all three to rule them out.

If you work primarily with words,

be sure to compare text quality of different monitors. It's a little-known fact that individual pixels vary in size and shape from one brand of monitor to the next. Because body-text type is often composed of one- and two-pixel-wide strokes, this variation can have a significant effect on the appearance of type on screen.

A comparison of Apple's Portrait Display and the Radius Full Page Display illustrates what I mean. New York font, a good all-around font for on-screen text work, looks spindly and anemic on the Apple monitor, and full and robust on the Radius. This difference was enough for me to strike the Apple monitor from my list.

Little (and Not So Little) Extras

Monitors differ significantly in the amount and quality of utility software they provide. Many monitors, such as those from Apple, are sold without software of any kind. Others, such as those from Radius and some models



The Radius monochrome and gray-scale Two Page Display

from E-Machines, include screen savers and utilities for tear-off menus, larger menu bars, automatic dialog-box centering, and more. Since utility software is not essential to the operation of the monitor and can even conflict with your existing INITs, it should figure little, if at all, in your buying decision. If the monitor you like best lacks utility software, you can easily buy a screen saver, tear-off menu utility, or whatever from a software company.

One especially useful capability for an external monitor is a virtual screen. With a virtual screen, the Macintosh is tricked into thinking that the active area is larger than it really is. When the cursor reaches the edge of the screen, the view automatically shifts to reveal the hidden part of the virtual screen. Several monitors, such as PCPC's ShadowGraph, Ehman's Two Page Monochrome Monitor, and the Nutmeg 19, come bundled with Berkeley Systems' virtual screen program, Stepping Out II.

Virtual screens are built into the hardware of other monitors. Hardware-based virtual screens do not use System RAM as software-based ones do and they usually allow smoother panning. Radius's Full Page Display (real resolution 640 by 864 pixels) offers a virtual resolution of 1024 by 864. SuperMac's Grayscale/Monochrome Display offers three virtual resolutions (at the expense of the number of gray levels), the largest being 4096 by 1536 pixels. And E-Machines' already large The Big Picture Z21 supports dozens



Ehman Two Page Monochrome Display

of different virtual resolutions, with sizes up to 10,240 by 960 pixels.

The Right Tool for the Job

We didn't use Price Waterhouse to tabulate the results, but the staff at Macworld Labs and I did choose our favorites, and I'll end the suspense and

open the envelopes. Our picks are predicated on common tasks such as editing text and graphics as well as on our testing results.

For a full-page monitor, we preferred Radius's Full Page Display because of its superior text quality and sharp focus. We settled on two choices for a big-screen black-and-white monitor. MegaGraphics' MegaScreen 2001/3001 has a near-WYSIWYG pixel density of 75 dpi and performed consistently well, in our opinion. Radius's Two Page Display is the other big-screen favorite; it's the same size as the MegaScreen, but it displays a larger page area at a non-WYSIWYG 82 dpi. For a big-screen gray-scale monitor we also chose two. Again, one is the Radius Two Page Display, this time with a gray-scale board. The other is Sigma Designs' SilverView, a true WYSIWYG monitor (at 72 dpi), whose phosphor, unlike that of our other picks, is on the yellow side. Runners-up in the two big-screen categories include the

RasterOps ClearVue and SuperMac's Grayscale/Monochrome Display.

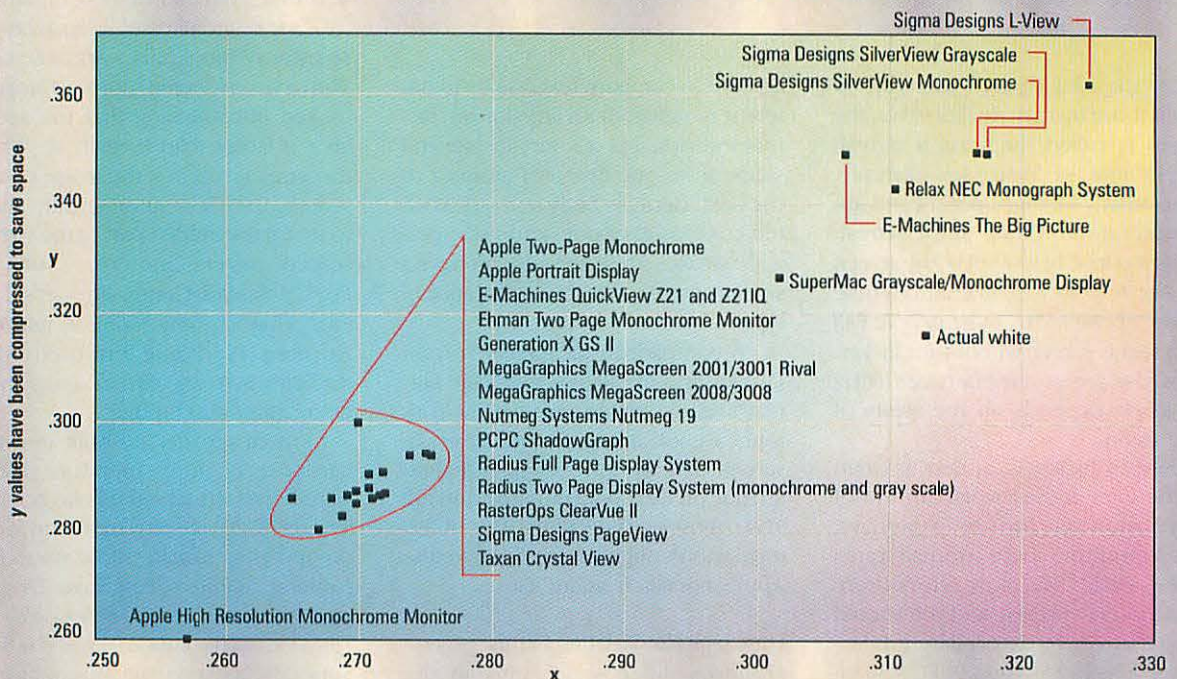
Finally, you may have noticed that I've said little about the price of monochrome monitors. Because you will have to live with your monitor day after day, possibly for many years, the choice has more to do with how well you work together than it does with money. If you buy a monitor primarily because it's inexpensive, one morning you may find yourself sitting opposite a monitor you can't stand to look at anymore. My advice is to save your eyesight and your sanity and hitch up with the right monitor the first time, even if it costs a bit more. **M**

See Where to Buy for contact information.

.....
Robert C. Eckhardt is a Macworld contributing editor, and author of *The Fully Powered Mac* (Brady Books, 1988) and *The FullWrite Professional Handbook* (Brady Books, 1989).

PHOSPHOR COLOR

Measured as x and y coordinates on a detail of a standard CIE chromaticity diagram



Even though these are monochrome monitors, each has a distinctive tint. Blue is the color people are accustomed to seeing on a Mac's screen and is best in fluorescent light. Yellow is easier on the eyes in incandescent light. We used a Minolta TV Color Analyzer to test phosphor color.

GEEK CHIC

Preview Issue

When is a geek
chic?



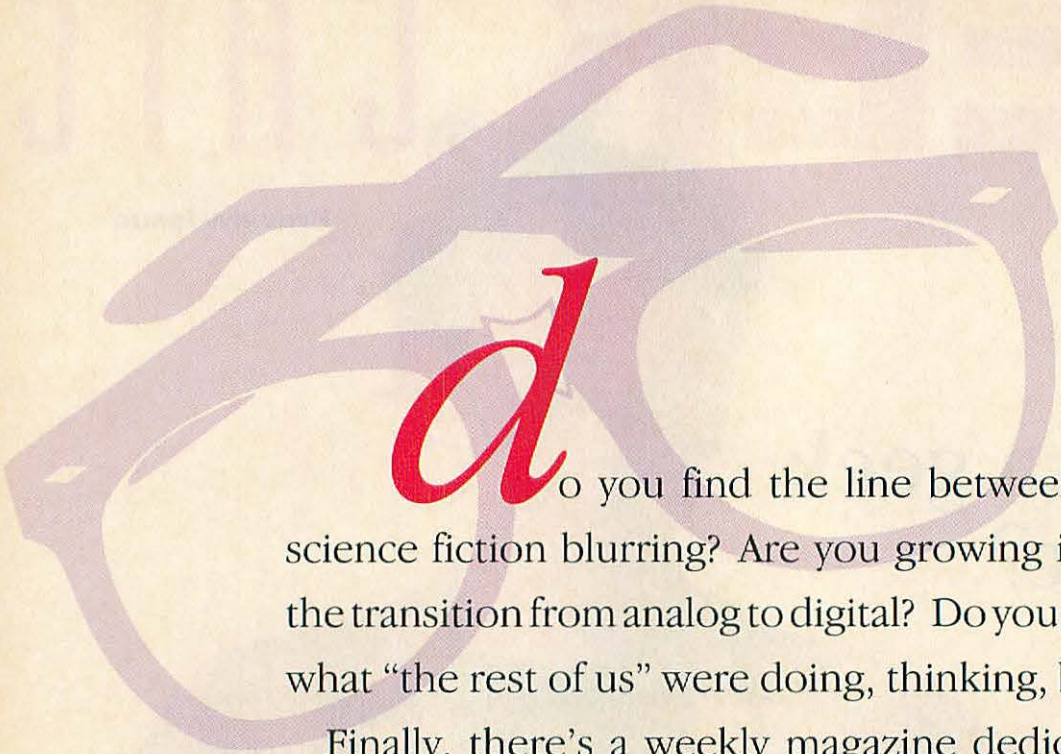
THE JOLT DIET

INTEGRATED FASHION CIRCUITS

BINARY LOGIC LINGO

UNMASKING THE TECHNO ELITE

MACWORLD PRESENTS NEW
SISTER PUBLICATION



do you find the line between real life and science fiction blurring? Are you growing impatient with the transition from analog to digital? Do you wish you knew what "the rest of us" were doing, thinking, buying?

Finally, there's a weekly magazine dedicated to documenting the manners and tastes of those who boot up and

log on daily. *Macworld* is proud to announce the launching of our new sister publication . . .

GEEKCHIC™

Just as the phonograph once shaped the aesthetic of an entire era, the personal computer promises to spawn a life-style all its own. "The geeks of today are the trendsetters of tomorrow," claim the founders of Harvard's Society of Nerds and Geeks (SONG). We couldn't have said it better ourselves.

The technology has cunningly woven itself into our social fabric. T-shirts, shoulder bags, and bumper stickers broadcast allegiance to user groups and software products. Casual conversations are peppered with a brand of technospeak that was once the hallmark of the electronic nerd or ham radio operator. Macintoshes appear as props in the trendiest sitcoms and advertisements. Geekdom unexpectedly finds itself stylish.

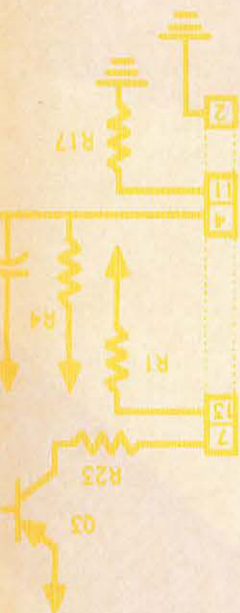
As a fascination with the accoutrements of computing eclipses the allure of the technology itself, we find a new aesthetic shaping our expectations. No longer satisfied with adding a new peripheral or a project-management application to our computing environment, we stroll the aisles of computer emporiums and thumb through mail-order catalogs looking for power, excitement, and peer approval. *GeekChic*™ is the atlas to aid us in navigating these uncharted electronic waters.

GeekChic™ will feature book and demo reviews, blow-by-blow accounts of all the major Mac-

related court cases, and how-to articles covering topics such as applying faux finishes to your Mac and sewing custom dustcovers for hard-to-fit peripherals. We'll offer in-depth tip sheets for programs such as ResEdit, MacsBug, or Multi-Finder. After each Mac trade show, we'll rank the promotional bags and badges and tell you which were most popular on the show floor. We'll critique the symposia and rate the nearby cafés and restaurants.

And each week you can look forward to our regular columns and departments. *Geek of the Week* offers profiles of movers and hackers within the Mac community. *GeekChicSpeak* will offer an illuminating collection of odd words, phrases, and acronyms. *Celebrity Makeovers* will turn famous users' Mac configurations into cutting-edge workstations. And finally, inspired by an article in *Cosmopolitan* magazine that dubbed the Boston Computer Society "one of the best places to meet men in Boston," we introduce our *Meet a Geek* personals column. Lonely readers will no longer need to look for companionship while dawdling over remastered printed circuit boards from France.

If you've read this far, you're just the nineties sort of person we're looking for. Go on, admit it. You're *GeekChic*™. Whether you subscribe to our glossy hard-copy edition or to our electronic online version, we know you'll be glad you're keeping up with the geeks. And remember, if you subscribe to *GeekChic*™ before April 1, you could win big prizes.



GEEK OF THE WEEK

Geekness is a frame of mind. Some are born to it; others gravitate toward it. Each week we'll interview individuals who embody the geek ethos. We'll probe their bioROMs and offer insights into the thought processes of the users and shakers who are shaping our electronic environment.

Our first *Geek of the Week* is Plato Cobol, author of the ever-popular adventure games *Windoids from Hell*, a nightmarish ride through the brain of an object-oriented programmer, and *Marching Ants*, an arcadelike game with an add-on that allows the keyboard to carry small electrical charges.

GC: Hi Plato, thanks for taking the time to meet with us.

PC: Right, so let's hit it. I've got a killer deadline to meet.

GC: What project are you working on right now?

PC: Bomber Billiards. It's a game that combines flight simulation with 3-D billiards. We're going into beta right now. So far everyone who's seen it thinks it's the hottest thing since Tetris.

GC: Why do you think sports-simulation games are so popular with geeks?

PC: You don't have to wear special clothes, and most of us were never that good at the real thing anyway.

GC: You're a prolific programmer. What's your daily schedule like?

PC: Go to bed at dawn. Wake up at noon. Eat breakfast. Then work until dawn again.

GC: Breakfast is your only meal?

PC: Well, I wrote a little program that turns my coffee maker on whenever I boot up, and there's a Jolt Cola dispenser down the hall. I modem out for pizza once in a while.

GC: You know of a pizza place that lets you order via modem?

PC: Sure, it's called Big Bytes.

GC: Do you have a separate phone line for your modem?

PC: Of course. What if my mother wanted to link me?

GC: Your mother is a Mac user?

PC: She's a sysop for a BBS that lets subscribers play bingo online.

GC: You have quite a setup here. I see quite a few storage devices piled up here. What are you using these days?

PC: Well, I have three hard disks daisy-chained together—an old 40MB and two 100MB ones. Plus I have a tape drive for backup, and I've been experimenting with an erasable optical.

GC: Do you still run out of space?

PC: Sure. All my INITs and cdevs barely fit on the small drive.

GC: Do you beta test many programs?

PC: Yeah, what's it to you? I take nondisclosure pretty seriously.

GC: Sorry, didn't mean to pry. What's the first thing you do after installing a new application?

PC: Memorize the keyboard shortcuts.

GC: Have you ever borrowed or lent any pirated software?

PC: I thought we agreed that you wouldn't ask those kinds of questions.

GC: Sorry. What's your favorite program?

PC: MacsBug.

GC: What's your most prized possession?

PC: Well, that would have to be either my unmodified 128K or my HomeBrew Computer Club T-shirt.

GC: Do you back up regularly?

PC: Nah, backing up is for wimps.

GC: I see the complete set of *Inside Macintosh* on your shelves. Have you read them all?

PC: Read them? Hell, I've memorized every volume. Go on, ask me anything.

GC: No, no. I believe you. So how did you get started with the Mac?

PC: I wrote a fan letter to Steve Wozniak back in the old days. He invited me to drop by. It's been strict interface guidelines ever since.

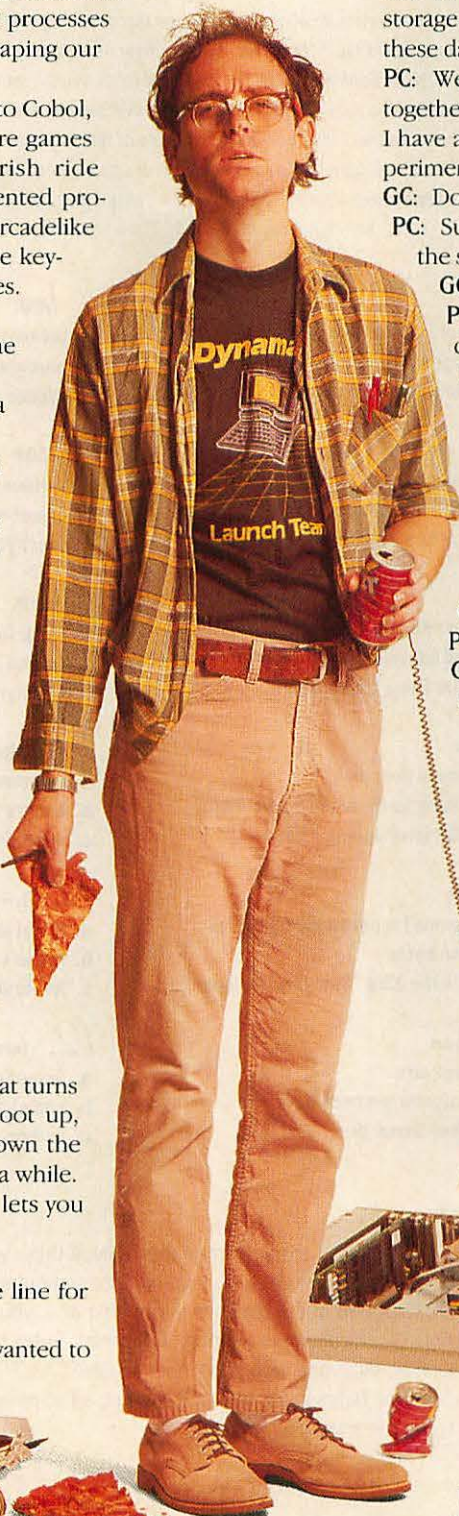
GC: Ever been tempted to abandon the Mac for Jobs's black box?

PC: Naw, programming it is too easy.

GC: Well, Plato, I see we're nearly out of time. Thanks a lot for being

our first *Geek of the Week* and good luck with Bomber Billiards.

PC: Yeah, right, so when do I get my *GeekChic*™ T-shirt?



#include "data.h"

main()

{

grafptr gp, gpsave; /* two pointers to grafports */

integer right;

char *malloc(); /* memory allocation

right = theport->portrect

printf("The right s

gpsave = theport

printf("The gra

printf("Hit th

while (!butt

gp = (grafptr

openport(gp

erasetect (&

framerect (&

moveto(20,5

printf("gp

theport

printf("Nov

gp->

printf("The

textfont(1)

textsize(10

printf("but

printf("Hit t

butt

printf("Nov

printf("Hit t

printf("Nov

printf("Hit t

printf("Nov

printf("Hit t

printf("Nov

printf("Hit t

printf("Nov

printf("Hit t

printf("Nov

printf("Hit t

printf("Nov

printf("Hit t

printf("Nov

printf("Hit t

printf("Nov

printf("Hit t

printf("Nov

printf("Hit t

printf("Nov

printf("Hit t

printf("Nov

printf("Hit t

printf("Nov

printf("Hit t

printf("Nov

printf("Hit t

printf("Nov

printf("Hit t

printf("Nov

printf("Hit t

printf("Nov

printf("Hit t

printf("Nov

GEEKCHIC Speak

The vernacular of geekdom can be disconcerting for the uninitiated. Readers of *GeekChic™*, however, will no longer need to worry about confusing terms such as Boolean and bezier, grep and fetch, widow and orphan. In our *GeekChicSpeak* column, noted technolinguist William Satire will analyze the etymology of the terms that make up the lingua franca of the cybernetics set. After reading *GeekChicSpeak* for a few issues, you'll never again be caught speechless at a trade show or user-group meeting. To gauge your current grasp of the Mac's idiomatic argot, we've put together a quiz. Have fun and don't cheat.

1. INIT

- a. member of Eskimo tribe
- b. small program launched at start-up
- c. shiny black insect that bites

2. RAM

- a. John Sculley's astrological sign
- b. random access memory
- c. member of Los Angeles football team

3. ISDN

- a. I Still Don't Know
- b. Integrated Services Digital Network
- c. InterStellar Dime Nickelodeon

4. hot link

- a. Cajun ground pork dish
- b. programming tie between applications
- c. secret KGB wiretapping device

5. terabyte

- a. popular name for pet snapping turtles
- b. one trillion bytes
- c. an alien in the 23rd "Star Trek" episode

6. SCSI port

- a. Fleet Week site
- b. small computer systems interface
- c. cheap after-dinner drink

7. MIDI

- a. below-the-knee fashion for women
- b. musical instrument digital interface
- c. Walter's surname

8. OOP

- a. surname of comic Neanderthal
- b. object-oriented programming
- c. what you say after locking yourself out

9. pixel

- a. small fairylike creature
- b. screen display unit
- c. hairstyle popular in the 1950s

10. alpha channel

- a. swimmer's ultimate challenge
- b. 8 extra bits in new QuickDraw
- c. noted Parisian perfume

11. QuickDraw

- a. Huckleberry Hound's cohort
- b. Apple's screen-imaging system
- c. left-brain enhancement technique

12. terminator

- a. Schwarzenegger's job description
- b. end of a SCSI connection
- c. author of dictionary

SCORING: Real geeks are so sure of themselves they wouldn't deign to check here; but give yourself an extra ten minutes with your favorite computer game for each *b* answer. If you answered more than two of the questions with an *a* or *c*, you definitely need to commit each week's *GeekChicSpeak* column to memory. Get smart. Subscribe to *GeekChic™* now.

And remember, everyone who subscribes to *GeekChic™* before April 1 will receive, absolutely free, Acronyms Dancing on the Head of a Pin, an animated HyperCard stack that indexes over 10,000 computer-related acronyms.



MEET A GEEK

After distributing pilot issues of *GeekChic*™ at a few of the finer Silicon Valley delicatessens, we discovered that one of the most popular sections was *Meet a Geek*. Readers submit listings to our personals column describing the contents of their System Folder, their backup routine, and their favorite clip art package; each hopeful was assigned one of our electronic-mailbox numbers. Dozens of readers too bashful or too busy to meet significant others through traditional mating services have found *Meet a Geek* the ideal forum for their romantic exchanges.

We are pleased to announce that one such couple, Bitsy Apda and Chip Simm, are now engaged to be married. "I didn't realize that love was just a 9600-baud modem away," says Bitsy, a programmer for a major database developer. She fell for Chip when she read the message he'd uploaded to her box number: "Hey, gigababe, why buy a generic OEM hard drive when, for a mere \$300 extra, you can enjoy the prestige, security, and free coffee mug that comes with the same drive in a brand name box!" Chip, a WORM-drive developer, was intrigued when he heard that all of Bitsy's dreams adhered to Mac interface guidelines; and when she wrote that she wrapped her Ilcx in a silver lamé cover, he just had to see it.



Talk about magneto-optical! Chip and Bitsy are definitely stuck on each other.

For their first date, Bitsy packed a romantic lunch for two in her Portable Mac case, and Chip arrived carrying a 24-bit printout of digitized roses. Both were wearing anti-radiation glasses and Screenscreen (a zinc oxide-like substance that guards against harsh monitor rays), and between them they were carrying several dozen floppies. The duo were so taken with each other that they began designing desktop-published wedding invitations on the spot.

Currently in the process of combining their extensive collections of Apple logo pins and badges, Bitsy and Chip look forward to uploading joint holiday greetings for many fiscal years to come.

WIN BIG PRIZES!!!

GeekChic™ isn't publishing yet, but prizes and bonuses await as soon as it does. In addition to the animated HyperCard stack, Acronyms Dancing on the Head of a Pin, readers will receive an official *GeekChic*™ T-shirt and their names will be entered in our *GeekChic*™ Sweepstakes. Three lucky winners will receive the ergonomically designed Keyboardion from Vapo-Matix. Besides easing repetitive-stress syndrome, the Keyboardion comes programmed to play several popular polkas. **G**

Writers interested in submitting articles to *GeekChic*™ should send manuscripts with SASE to *GeekChic* editor Suzanne Stefanac.

If you've read this far, you're our kind of reader. As with so many other products coveted by true geeks, *GeekChic* isn't shipping yet and, quite frankly, may never ship. Stay tuned for possible beta publication next April Fool's Day.

Readers Will Wear This Shirt

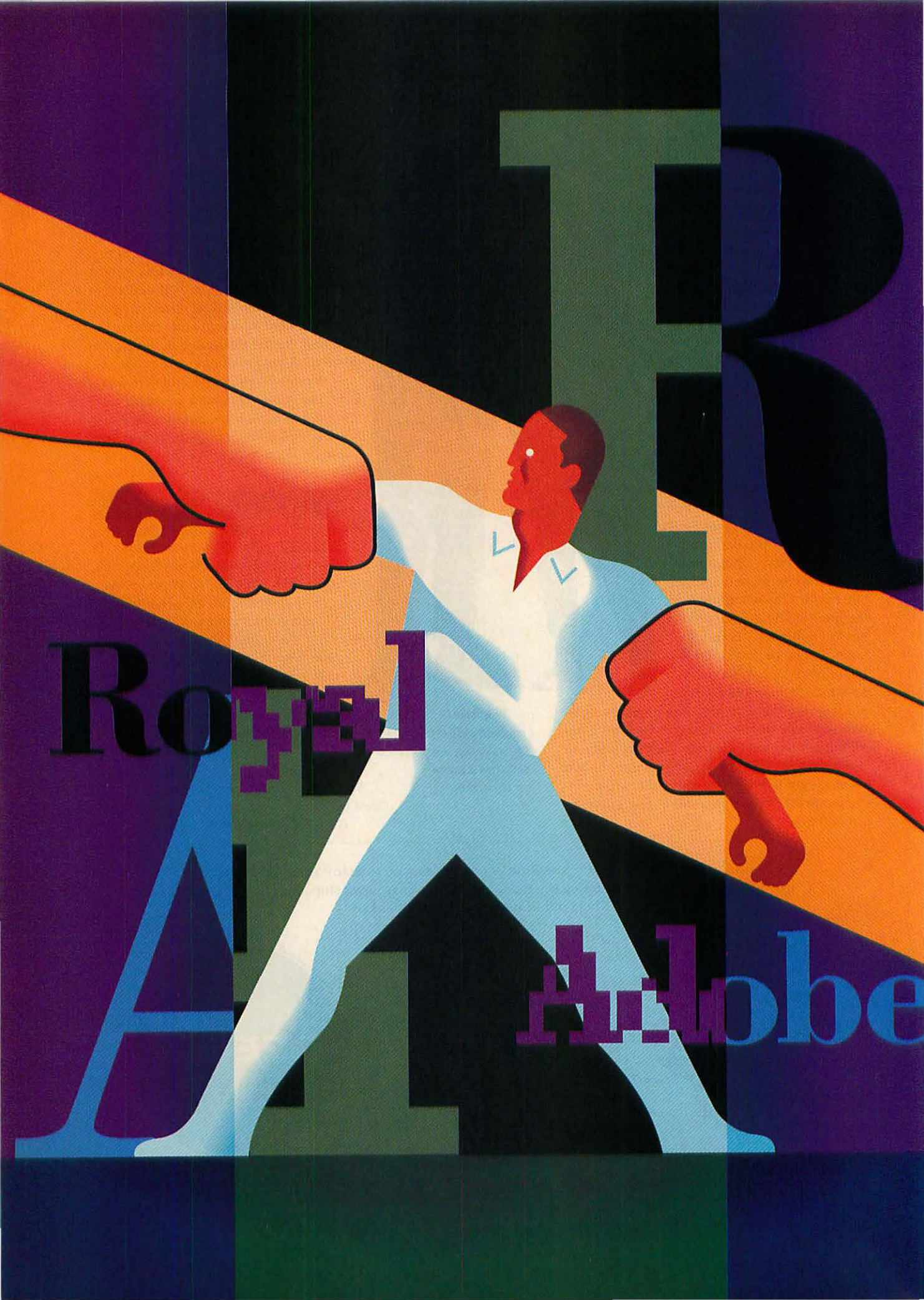


GEEK CHIC

Neither the magazine nor the T-shirt are available yet, but you can wear our *GeekChic* button. Just cut along the dotted line, back with double-sided tape, and wear with pride.

The Keyboardion
"the ergonomic keyboard"

Sweepstakes Prize



Royal

Antelope

BATTLE ROYAL

The impending release of Apple's Royal font format raises important questions for publishers and everyone else who uses Mac type. Does this challenge to the PostScript standard spell the beginning of chaos, or the end of a monopoly? A special report on the future of fonts.

Just when Mac publishers were getting the hang of PostScript fonts, Apple went and announced its own font format, dubbed Royal. Many Mac owners are confused by the prospect of dealing with two font formats. How do they differ? Will current PostScript fonts work with new Apple hardware and software? Will the new Apple fonts work with existing hardware and software? What if you already own a substantial library of PostScript typefaces—can you mix the two formats? If you're new to desktop publishing, should you put off buying typefaces and a printer until Apple's new format arrives?

In an attempt to answer these and other questions, I spoke recently with a number of type-industry experts, including the product manager of Apple's Imaging Systems Group, Jim Gable, and Kevin Wandryk, typographic business manager at Adobe Systems. Their analyses and comments help shed some light on what 1990 and beyond will hold for Mac publishers.

Font History: An Outline

For those who haven't kept up with last year's dramatic font developments, here's a synopsis. Despite a long-running lawsuit over interface design, when it comes to font technology Apple and Microsoft have decided to bury the hatchet. In this case, they've buried it in Adobe's back.

The first blow came in the spring of 1988, when Apple announced it would use its own screen-display software rather than licensing Adobe's Display PostScript, a technology that would have made PostScript the standard for both screen display and output. Then Apple announced plans to develop its own outline fonts instead of sticking with Adobe's PostScript font format. In the summer of 1989, Apple sold its considerable holding of Adobe stock. The coup de grace came at a press conference last September: Apple and Microsoft announced an alliance that teams Apple's new font

technology with a PostScript-clone interpreter acquired by Microsoft. Apple's font technology will be incorporated in Microsoft's OS/2 Presentation Manager for screen display on IBM PCs and compatibles; and Microsoft's PostScript-clone interpreter will be included in future Apple laser printers. Because Microsoft and Apple now share a common font format, Mac and PC owners will be able to use the same font library and printers, resulting in greater compatibility between the two kinds of machines.

Keep in mind that Apple is not abandoning PostScript itself as a printing technology, but rather breaking

free of Adobe's implementation of PostScript. The interpreter Microsoft purchased uses Adobe's PostScript language but was independently developed by Bauer Enterprises. Apple has diverged from PostScript as a font format, however; Royal employs Apple's own method of describing character outlines.

To understand these developments it's useful to take a look at the history of the Apple-Adobe relationship. When the Macintosh was introduced, desktop publishing didn't exist. Then came the LaserWriter, which, in the opinion of many, saved the Mac's bacon, transforming the Macintosh from a novelty into a tool for producing professional-quality type and graphics. The LaserWriter contains Adobe's proprietary PostScript interpreter—software that receives PostScript instructions from an application and translates them into instructions that tell a printer where to lay the dots that make up a printed page. The Las-

erWriter also contains a set of built-in PostScript fonts created by Adobe and optimized for printing at 300 dots per inch. To use the PostScript fonts and interpreter, Apple—and later other printer manufacturers—had to pay royalties to Adobe.

Not all printer companies wanted to pay Adobe royalties, however, so some struck out on their own and developed their own PostScript interpreters, which eventually appeared in the so-called PostScript-clone printers and imagesetters. The clone manufacturers had access to Adobe's PostScript specifications, which were published in Adobe's *PostScript Language Reference Manual*. But the book didn't tell developers everything; clone interpreters were in development for years. When the PostScript-clone developers finally got their printers to work, they wouldn't print Adobe fonts. Why not? Because Adobe's fonts are encrypted, which means that only printers with a true Adobe PostScript

Garamonds Galore

The faces on the left are printed at the relatively low resolution of 300 dpi, while the ones on the right are printed at 1270 dpi. The hints included in Type 1 faces improve their appearance somewhat on 300-dpi devices such as the LaserWriter, but this advantage disappears at higher resolutions.

Type 1 PostScript, 300 dpi

ADOBE GARAMOND

Garamonds Garamonds Garamonds

GARAMOND 3 (ADOBE)

Garamonds Garamonds Garamonds

STEMPEL GARAMOND (ADOBE)

Garamonds Garamonds Garamonds

Type 3 PostScript, 300 dpi

GARAMOND ANTIQUA (AGFA COMPUGRAPHIC)

Garamonds Garamonds Garamonds

ITC GARAMOND BOOK (BITSTREAM)

Garamonds Garamonds Garamonds

SIMONCINI GARAMOND (THE FONT COMPANY)

Garamonds Garamonds Garamonds

Type 1 PostScript, 1270 dpi

ADOBE GARAMOND

Garamonds Garamonds Garamonds

GARAMOND 3 (ADOBE)

Garamonds Garamonds Garamonds

STEMPEL GARAMOND (ADOBE)

Garamonds Garamonds Garamonds

Type 3 PostScript, 1270 dpi

GARAMOND ANTIQUA (AGFA COMPUGRAPHIC)

Garamonds Garamonds Garamonds

ITC GARAMOND BOOK (BITSTREAM)

Garamonds Garamonds Garamonds

SIMONCINI GARAMOND (THE FONT COMPANY)

Garamonds Garamonds Garamonds

interpreter can read them. Most printer companies got around this difficulty by using unencrypted fonts from font giant Bitstream.

Give Me a Hint

Printer manufacturers weren't the only ones who chose alternatives to paying for Adobe's technology. In addition to licensing its PostScript interpreter to printer manufacturers, Adobe also licenses its font-creation technology to type manufacturers, such as Agfa Compugraphic, Autologic, Linotype, Monotype, Morisawa, and Varityper.

Adobe and Adobe-licensee fonts are known to digital typographers as *Type 1* fonts. These fonts, in addition to being encrypted, include proprietary scaling algorithms known as *hints*. Adobe's hints optimize the appearance of printed characters, making minute adjustments to produce even stem weights, consistent character heights, and other characteristics that make type look good at low resolutions. Adobe's hints work in conjunction with a *rasterizer*, software that converts an outline into a printed bitmap.

Many type designers create *Type 3* fonts, which are PostScript fonts without Adobe's hinting or encryption. ("Whatever happened to Type 2?" you might ask. On Adobe's evolutionary tree Type 2 was a branch that died off when a proposed technology didn't pan out.) Some companies use their own font-creation software; others use Fontographer, a font-creation program from Altsys Corporation. Like Type 1 fonts, Type 3 fonts can be downloaded to a PostScript laser printer or image-setter. While many Type 3 fonts don't look as crisp and clear as Adobe's hinted fonts when printed at low resolutions, the discrepancy disappears at high resolutions, where the grid of dots that makes up characters is composed of much smaller dots. (Note: Version 3.0 of Fontographer lets type designers add hints, but for the most part, the current crop of Type 3 fonts are unhinted.) "Garamonds Galore" compares Type 1 and Type 3 fonts printed at two different resolutions.

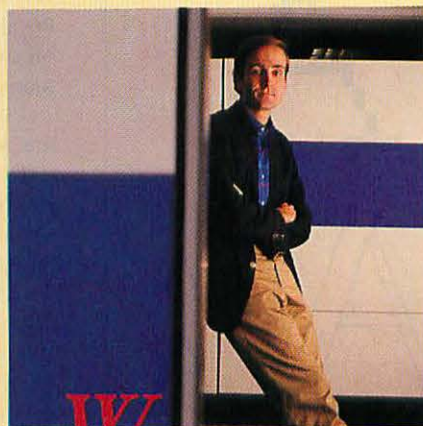
Some type designers—along with purveyors of Type 3 fonts, of course—contend that Adobe's hinting technology degrades the quality of traditional type designs because it regularizes let-

terforms, for example, making stem weights even when in some cases there *should* be subtle differences in weight. Adobe's Kevin Wandryk admits that some of Adobe's earliest typefaces may have erred on the side of character regularization but insists that current designs adhere as much as possible—within a digital format—to the original type designs. "There's nothing in our font technology that mandates over-regularization," he says.

Some companies, such as Bitstream, use their own hinting strategies. Bitstream's *Type A* outline fonts, which are used with printers that employ Adobe's interpreter, don't include hints. Bitstream's *Type B* fonts, which are used with clone interpreters that employ Bitstream's Fontware scaling technology, include Bitstream's own hints; the company's *Type C* fonts, designed for PostScript-clone printers that use neither Adobe's nor Bitstream's scaling technology, contain no hints. Other companies argue that hints are unnecessary, since serious users will print final copy on high-resolution imagesetters and use 300-dpi printers mainly for proofing.

1 for All?

We'll see if any of Adobe's critics change their tune about the quality of Type 1 fonts when given the chance to create Type 1 fonts of their own. Last September, in a surprise response to the Apple-Microsoft announcements, Adobe declared that it would publish the specifications for Type 1 fonts, making these hitherto well-guarded secrets an option for any type designer—and theoretically making it possible for PostScript-clone printers to use Adobe's fonts. Keep in mind, however, that publishing the specifications is not the same as giving away source code; developers will still have



ROBERT HOLMGREN

When our fonts go into our new version of PostScript, they'll do anything PostScript fonts can do.

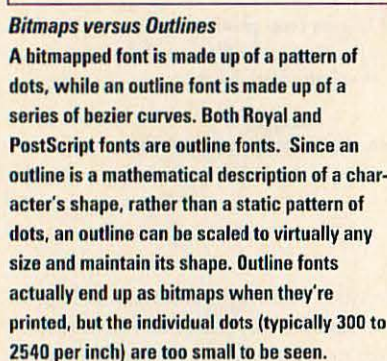
JIM GABLE
MANAGER, APPLE'S IMAGING SYSTEMS GROUP

to do some work. Likewise, Adobe is not giving away the code for its rasterizer program. Adobe's chairman, John Warnock, compared the publication of the Type 1 specs to giving auto manufacturers the parts list for a Ferrari and leaving it up to them to figure out how to build the car.

Therefore, even after the Type 1 specs are published, Adobe will continue to license its Type 1 font-creation tools to interested type houses. So Adobe hasn't provided a completely open format, but it has opened the door a crack. Publishing the Type 1 specs now may turn out to be too little too late; a major selling point to developers considering Royal is that Apple's font format, unlike Adobe's, is completely open. Apple will provide the specifications for Royal fonts in the System 7.0 developers' notes. (For a preview of System 7.0, see *Macworld*, August 1989.)

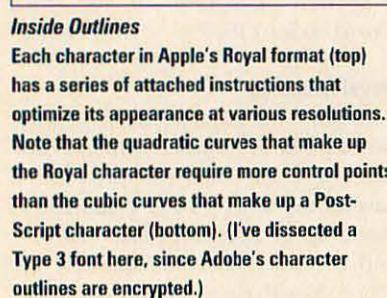
Royal Revealed

So, what is the Royal format? Basically, Royal fonts are outline fonts, as are the PostScript fonts you print on a LaserWriter today. Each character is made up of a series of lines, curves, and control points that describe its shape. As with current PostScript fonts,



A bitmapped font is made up of a pattern of dots, while an outline font is made up of a series of bezier curves. Both Royal and PostScript fonts are outline fonts. Since an outline is a mathematical description of a character's shape, rather than a static pattern of dots, an outline can be scaled to virtually any size and maintain its shape. Outline fonts actually end up as bitmaps when they're printed, but the individual dots (typically 300 to 2540 per inch) are too small to be seen.

A bitmapped font is made up of a pattern of dots, while an outline font is made up of a series of bezier curves. Both Royal and PostScript fonts are outline fonts. Since an outline is a mathematical description of a character's shape, rather than a static pattern of dots, an outline can be scaled to virtually any size and maintain its shape. Outline fonts actually end up as bitmaps when they're printed, but the individual dots (typically 300 to 2540 per inch) are too small to be seen.



Each character in Apple's Royal format (top) has a series of attached instructions that optimize its appearance at various resolutions. Note that the quadratic curves that make up the Royal character require more control points than the cubic curves that make up a PostScript character (bottom). (I've dissected a Type 3 font here, since Adobe's character outlines are encrypted.)

Each character in Apple's Royal format (top) has a series of attached instructions that optimize its appearance at various resolutions. Note that the quadratic curves that make up the Royal character require more control points than the cubic curves that make up a PostScript character (bottom). (I've dissected a Type 3 font here, since Adobe's character outlines are encrypted.)

To appreciate the implications of this, let's briefly review how fonts work today. In the simplest scenario, when you're printing on a dot matrix printer such as the ImageWriter, you use only bitmapped fonts. You use Apple's Font/DA Mover, which places fonts in the System file where they'll be available to all applications, to install as many sizes of bitmapped screen fonts as you wish to print.

But let's say you want to print 14-point text. If you install a 14-point font for the screen display—and a 28-point screen font for printing at the higher resolution—all is well. But as it turns out, Bitstream doesn't supply a 28-point screen font in its MacFontware packages. Now, let's suppose you want to print 16-point text on the ImageWriter. Alas, Bitstream doesn't supply a 16-point screen font (nor do most font vendors, since 16-point isn't considered a common size). If you select the 16-point size option in a word processor or other application, the Mac's QuickDraw algorithms will do their best to scale the characters to 16-point, but the quality won't be very good. Therein lies a fundamental problem of bitmapped printing under the current scheme of things: if a font vendor doesn't supply a handcrafted version of a bitmapped font, you're out of luck.

ImageWriter LQ, you have to install a screen font that's three times the size you want to print. For the LaserWriter IISC, you have to install a font that's four times the size of the printed font. Again, you're faced with the chore of installing the correct sizes of screen fonts, each of which eats up precious disk space.

According to Apple's Jim Gable, System 7.0 will do away with the muss and fuss of installing screen fonts with the Font/DA mover. You'll be able to simply drag a font icon into the System Folder, and System 7.0 will automatically create readable screen fonts at any size. (Gable claims this method has the added bonus of eliminating those pesky font ID number conflicts that have plagued power publishers in the past.) And you'll be able to print good-looking text on QuickDraw-based printers without having to worry about which sizes to install.

In addition to simplifying screen display and QuickDraw-based printing, Royal font outlines will also be used to print high-quality text on Apple's PostScript-clone printer (or PostScript-compatible printer, as they prefer to call it), just like PostScript fonts are used with today's Adobe PostScript printers. The character outlines will be scaled and printed at any size your application supports, be it 7.5-point or 75-point text.

Although Royal and PostScript fonts are both outline fonts, there are some differences between the two formats. For example, Royal fonts are made up of *quadratic curves*, while PostScript font outlines are composed of *cubic curves*, which require fewer control points to define a character's shape. According to Gable, the mathematics used to scale and transform (rotate, stretch, and so on) quadratic curves is simpler, and hence faster, than the math used for cubic curves. On the other hand, since quadratic curves use more control points, Royal outline files will be larger than their PostScript counterparts (not much larger, asserts Gable). For a side-by-side look at the points and curves that make up a Royal character and a PostScript character, see "Inside Outlines."

Another difference between PostScript and Royal fonts is in where you find a font's intelligence—the instruc-

tions that tell a printer which dots to fill in at various sizes and resolutions. Apple has chosen to build Royal's intelligence into the font itself; each character has a set of hinting instructions attached to it. "All the hard work happens in the font instructions," says Gable, "rather than at scan-conversion time [when instructions are sent to a printer]. Once the instructions are done, the pixels are filled in very quickly." Developers can choose how sophisticated they want to make their hints; high-level hints will most likely increase processing time. How the overall display and printing speed of Royal fonts compares to that of PostScript fonts remains to be seen.

Adobe's approach, on the other hand, is to put most of the scaling intelligence in the rasterizer. According to Kevin Wandryk, "We think that font designers' concerns are twofold: they're interested in the shape of a character and in how it's spaced relative to other characters. Learning a programming language to make characters shouldn't be the font designer's concern. Besides, when you put the intelligence in the rasterizer, the technology behind rasterizing can get better and better and the font data doesn't have to change."

But Why a New Format?

Font format philosophizing is interesting, but it doesn't explain why Apple chose to forsake Adobe, especially for such a strange bedfellow as Microsoft. "The Microsoft agreement is really a technology exchange: our fonts for their PostScript," says Gable. "The benefit is that with a version of PostScript that has our fonts, not only will Apple be able to make better PostScript printers in the future, but we expect that third parties who license from Microsoft will also be able to make better PostScript printers for the Mac." In other words, Apple had a font format and Microsoft had a PostScript clone, and the result was a marriage of convenience.

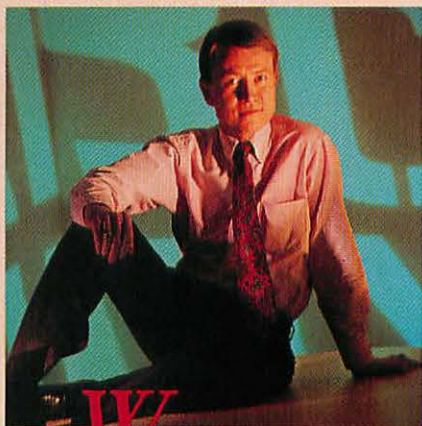
But Adobe's PostScript is a good printing solution, not to mention a well-entrenched standard. If it ain't broke, why fix it? Despite talk on Apple's part of improving quality and speed, most people agree that the real reason comes down to money—it's a

matter of Royal versus royalties. In combination with the Microsoft clone, the new font format is a way to get around the fees Adobe charges for its technology.

"I don't think anybody likes monopolies," says Louise Domenitz, Bitstream's director of corporate communications. "I think it's good that there's a second option in terms of an imaging model that incorporates attention to typographical needs. At first glance, it may seem like now there's something else to deal with—but I think what Apple is trying to do is raise the bottom line. Royal is a sophisticated format that allows for the preservation of typographic quality."

Agfa Compugraphic's marketing director Dan Richards is more straightforward in his assessment of Apple's decision. "I think Apple's saying to the world in general—and especially to Adobe—'We're not going to pay these high royalties to get a device. Not only are we not going to pay on the printer end, but we're not going to pay on the font end. And this is our answer because Adobe won't open up its technology.'"

Richards predicts that the price of both type and printers will fall as a result of increased competition. "Royal fonts will be considerably less expensive than current PostScript fonts because you won't have any royalties attached to them. And Adobe's font prices will probably drop as a result." As for printers, "It will be like the IBM PC all over again—someone comes out with a standard and everyone keeps doing it one better, and pretty soon it's the clones that are making all the money, not the originator. Adobe's PostScript will continue to be a standard, but I think in three to five years the clones will have more of the market than Adobe."



ROBERT HOLMSEN

We think that because of the expertise we've gained over the last five or six years, Adobe will be able to compete based on the quality of our implementation of both PostScript and PostScript fonts.

KEVIN WANDRYK
TYPOGRAPHIC BUSINESS MANAGER, ADOBE

Not everyone is happy with Apple's introduction of a new format, however. Paul Beyer, the owner of a design and production company and a member of the board of the New York Professional PostScript Users Group, feels that introducing a new standard will slow down the improvement of the previous standard. "As a graphic designer and a user of high-level imaging technology, I have absolutely no interest in Royal," says Beyer. "Apple has dollar signs in its eyes; what this format allows Apple to do is bring a whole lower end to the PostScript market. They haven't penetrated a large part of the office market because their output devices have generally been too expensive. The technology exchange with Microsoft opens up a larger market by introducing a new PostScript standard—or PostScript deviation, I should say."

Beyer feels that because developers will have to learn a new format, fewer resources will be devoted to improving Adobe's PostScript. "Many of the commercial projects I take on really push the technology. We were getting to the point where we were starting to approach the capabilities



Irom our point of view, you can get significantly improved typography using the Royal technology, rather than Adobe's technology.

ROB FRIEDMAN
PRESIDENT, BITSTREAM

of the high-end prepress systems. The Apple-Microsoft pact throws a monkey wrench in there. I have a system that works now; I don't want to take five steps backward and wait for Royal to catch up."

Adobe's Intermediate Solution

While Royal and System 7.0 have their proponents, the fact is neither is available now (at this writing, System 7.0 was reportedly scheduled for release in the late spring). Nor are the promised legions of Royal-format fonts here yet. And Jim Gable wouldn't comment on when we would be likely to see printers that include Microsoft's interpreter, either from Apple or from other companies.

In the meantime, Adobe hasn't been idle. Adobe Type Manager (ATM) has given us all a peek at what life will be like for all font users when System 7.0 arrives. (I'll describe the basics of ATM here; for a more detailed description, see the review in the February issue of *Macworld*.) Remember the earlier discussion of installing scads of screen font sizes for readable screen display and presentable printing? Well, Adobe's handy utility does away with all that. ATM takes scaling information from Type 1 PostScript fonts and ap-

plies it to characters displayed on the screen, producing sharp, legible type at virtually any size on the screen, as well as on QuickDraw printers (see "The Shape of Characters to Come").

To use ATM, you install it as a cdev (Control Panel device) and drag the outline fonts you want to use into the System Folder. You need to install only a single screen font for each typeface, and ATM automatically scales screen fonts to whatever size you specify. The results are impressive, both on screen and on paper. The \$99 utility includes four font families:

Times, Helvetica, Courier, and Symbol. A \$198 add-on package offers seven additional families. You aren't limited to this selection, however; ATM works with any Type 1 PostScript font.

System 7.0's font scaling has the additional advantages of not being limited to Type 1 fonts and of being built into the Mac's system software.

On the other hand, System 7.0 will require 2 megabytes of memory to run. Adobe Type Manager not only requires just 1MB to run, but it's up and running *now*, two decided points in its favor. (At least one company isn't waiting around for Adobe to publish its Type 1 specs in order to offer ATM-compatible fonts. The Font Company claims to have created Type 1 fonts without the benefit of Adobe's specs; according to a Font Company representative, these new fonts work with Adobe Type Manager.)

Apple or Adobe—or Both?

Despite the Apple-Microsoft pact, Adobe's PostScript isn't about to dry up and blow away. PostScript is built into printing devices from dozens of companies and is the format for hundreds of typeface families from numerous manufacturers. So it looks as if we'll be stuck with two standards.

Many Mac owners are dismayed by the prospect of two font standards, but compared to the current labyrinth of font formats, a mere double standard may not be so bad. Right now, we've got bitmapped fonts, outline fonts, PostScript printer fonts, QuickDraw printers with bitmapped fonts, and QuickDraw printers (from GCC) with outline fonts. There are fonts that work only in LetraStudio and fonts that work only on specific printers. Apple's

One size fits all

One size fits all

One size fits all

One size fits

One size

One si

One

One size fits all

One size fits all

One size fits all

One size fits

One size

One si

One

The Shape of Characters to Come

Adobe Type Manager (right) vastly improves the appearance of displayed text, as well as text printed on QuickDraw-based printers. System 7.0 will also scale displayed characters automatically, saving you the trouble of installing numerous sizes of screen fonts.

Jim Gable admits, "Frankly, [fonts] are kind of a mess. Professional users are used to it, but new users can't figure this stuff out. I think it's going to be better to have two formats than to have six or seven."

Since PostScript is here to stay, how will users cope with the existence of two formats? Once the dust settles, you'll be able to choose which format suits you—or possibly even opt for both formats.

Gable assured me that "one objective of System 7 is to be backward-compatible. The way System 7 is built, all the old font structures and printing structures are still there, and we have new ones next to them. We can guarantee that PostScript fonts will work the way they do today."

Gable also claimed Royal fonts will work with existing printers—including PostScript printers—although he was unable to explain exactly how. "Apple's engineers are looking at different options. Basically, we'll do a translation in the Macintosh and send out whatever kind of font a given printer can understand. The techniques for conversion will vary, but in general we're doing it in our printer drivers." In addition to Apple's efforts, Adobe is working on a utility that converts Royal fonts to PostScript for printing.

According to Gable, "If you go out and buy a font in the new format from, say, Linotype, we want you to feel comfortable that it will print to any printer—a PostScript printer, a Color-Quick printer from Tektronix, a film recorder from Mirus . . . one font does it all. We're doing things in our printer drivers where we need to, and in the System itself where we need to, in order to make fonts work on everything from the least expensive to the most expensive machines."

Although PostScript fonts will work as they do now, whether ATM—which apparently plays a little loose with Apple's developer guidelines—will work under System 7.0 remains to be seen. "ATM is kind of a ringer," says Gable, "and we don't really know too much about how it works. Our solution for ATM is that we're going to seed Adobe [with the new System] like we seed everybody else, and then they can revise ATM to work under

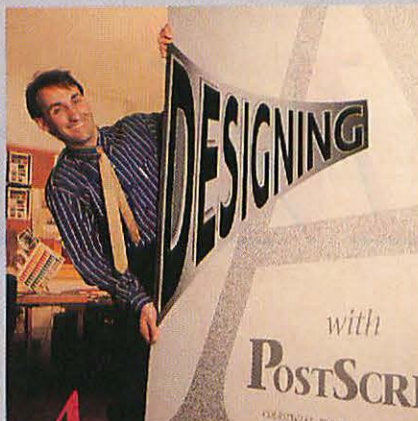
System 7." In other words, it will work if Adobe can make it work.

Other compatibility questions arise. For example, will PostScript fonts print on the new Apple-Microsoft clone printers? Don't bet on it. Also in the realm of speculation is whether Royal fonts will work with other PostScript-clone printers and typesetters, programs such as PageMaker that use their own printer drivers, and PostScript graphics programs such as Aldus Free-Hand and Adobe Illustrator. According to Gable, Royal theoretically poses no problem for any of these. We'll have to wait until later this year to see how well theory translates to reality.

How Royal fonts will compare to PostScript fonts with respect to such attributes as the file size, display speed, and printing speed remains to be seen, since only prototypes of Royal fonts exist at this writing. Quality will also have to be judged later. And quality may well vary from one type vendor to another; Apple is providing third parties with what developers generally acknowledge to be excellent font-making tools, but it is up to type manufacturers to use the tools to their potential. As Adobe's Wandryk points out, "The companies who are fastest in getting fonts to market may do so at the expense of quality."

Although Gable refused to comment on future Apple printers, he claimed that "when Apple's fonts go into our new version of PostScript, they'll do anything PostScript fonts can do."

A bold claim indeed, and at this point I have to agree with Adobe cofounder John Warnock that Apple and Microsoft "had better put up or shut up." Apple's new hardware and



DESIGNING
with
PostScript

As a designer, what I want is better output, better color, and a better technology base for PostScript. That's not going to happen if developers focus their energies on what's already been done. Anybody who's got a significant investment in PostScript technology stands a large chance of being hurt by what Apple and Microsoft are doing.

PAUL BEYER
PRESIDENT, NEW YORK PROFESSIONAL POSTSCRIPT
USERS GROUP

software is still under development, while PostScript is alive and well. If you are considering investing in fonts, PostScript is still the way to go—unless you've got plenty of time to wait. The number of PostScript fonts continues to mushroom and ATM provides a great step forward in convenience. (Look in *Where to Buy* under "Fonts" for a list of PostScript type vendors.)

With any luck, the font wars won't cause too many civilian casualties. Despite their differences, it's in neither Apple's nor Adobe's best interest to make things hard on the user. And despite the current confusion, Mac users may actually profit from the font feud. In the best-case scenario, the number of available faces will go up and competition will drive font and printer prices down. As they say, stay tuned for further details. ■

.....
Erbert Fenton is a Macworld contributing editor and the author of *The Macintosh Font Book* (Peachpit Press, 1989).

More For Your *Memory*

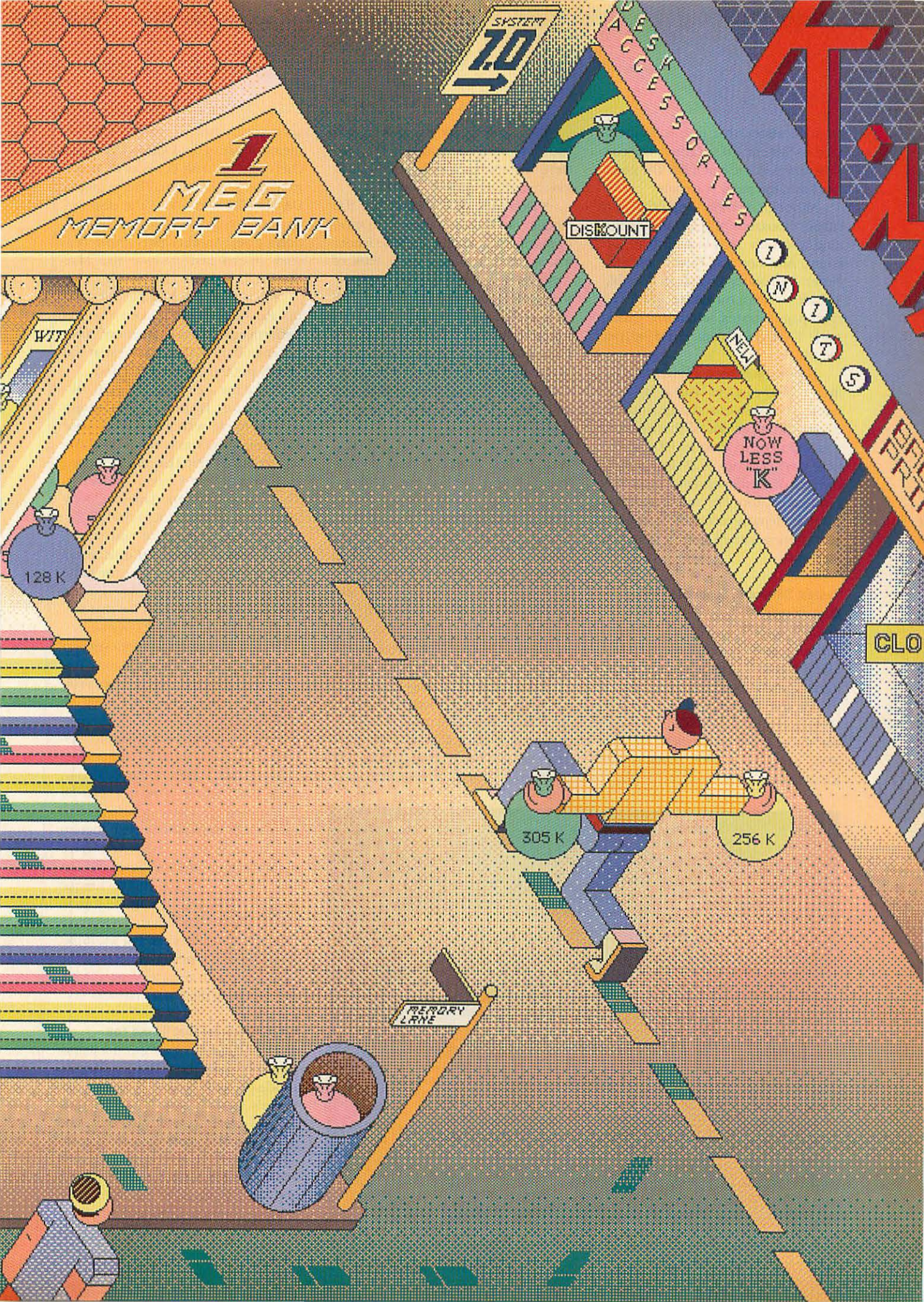
Tips and strategies
for getting the most from the
Mac's memory

Memory is like money: you can't have too much and you never seem to have enough. Where money is concerned, that means living within your means—scrimping instead of splurging, window shopping instead of store hopping, and choosing discounts over Dior.

Ditto with memory. You may long to run the latest designer programs, but if your Mac has only a megabyte or two of memory, they may not fit your memory budget. Time was when 1MB was a fortune you couldn't spend in a lifetime. Today, it's lunch money.

Blame it on software inflation. Today's applications are larger and more complex than yesterday's. They do more, but they need more room to do it. The Mac's system software is growing, too, as it keeps pace with increasingly complex hardware. When System 7.0 arrives this year, you'll need 2MB to run it.

by Jim Heid



As applications that take full advantage of System 7.0's features appear, 4MB may become cramped. The more you have, the more you want.

Although memory-chip prices are falling, thousands of Macs are still running with only 1MB in their bank account. And not just Pluses and SEs, either. The pricey Macintosh Portable includes a mere megabyte and it has champagne tastes, requiring exotic static RAM chips that cost \$649 per megabyte.

How do you keep a 1MB Mac alive in a multimegabyte world? By fine-tuning your system and your software to get the most out of the memory you have. The techniques I'll describe here work on Macs of all sizes, so you owners of multimegabyte machines can benefit, too. For an introduction to basic memory terms and concepts, see "Getting Started with Memory," in this issue.

System Software: Supporting the Bureaucracy

Just as part of your income goes to supporting the government, part of a Mac's memory goes to accommodating the fundamental software required to run the Mac. If you are running MultiFinder on a 1MB Mac, you're in the 40 percent tax bracket: of your 1MB, only about 600K remains free for your own use.

But as any clever taxpayer knows, you can control how much you pay. Here are several loopholes that can lower your system software tax.

- Don't use MultiFinder. Use the Finder's Set Startup command to specify that the Mac start up with the Finder instead. You'll gain an extra 160K of memory—enough to allow a 1MB Mac to run memory lovers like HyperCard, Ashton-Tate's Full Impact, Ietraset's ImageStudio, and Farallon's SoundEdit. And if you equip your Apple menu with a selection of desk accessories, you'll minimize application switching and still be able to do a few things at once.

- Disable background printing. PrintMonitor, a small application in the System Folder, lets you use MultiFinder to print to a LaserWriter in the background, but PrintMonitor requires 72K. If you can't do without MultiFinder, you can at least reclaim 72K when printing by using the Chooser to disable background printing. This also prevents the "There is insufficient memory to print at this time" message, which PrintMonitor displays when there isn't room for it to run.

- Open desk accessories in an application layer. When you open a desk accessory while using MultiFinder, the Mac loads a system file called DA Handler, which uses about 18K and provides a layer in which desk

accessories run. If you're low on memory, press the Option key while choosing the desk accessory's name from the Apple menu. This bypasses DA Handler and opens the desk accessory within the current application's layer. Another plus: the accessory opens faster since the Mac doesn't have to load DA Handler.

- Don't use a disk cache. The Control Panel's RAM cache option boosts performance but uses memory. After turning off the RAM cache, restart the Mac to put the change into effect.

- Use the appropriate system software version. By running the system version Apple recommends for your Mac, you won't waste memory on system routines the Mac doesn't need (see "What's Your Version Number?"). This is especially important for elderly Macs such as the 512K and 512K Enhanced. For example, if you start a 512KE with a System 6.0 disk, you'll have a scant 170K free. Start the same Mac with a System 3.2 disk—the version Apple recommends for that machine—and you'll have 274K free.

- Consider using an older version of the System. Recent versions use more memory than older ones. You can save some memory by using an older version—provided it's compatible with your Mac. For example, System 6.0.2 leaves about 647K free on a 1MB SE, but System 4.1 (released in April 1987) leaves 724K free. But be forewarned: you may not be able to run recent applications that require the latest System. Check your programs' manuals to see which version they require, and use this technique as a last resort only. Finally, be sure to use all the system files that accompanied the older version. For example, don't replace a newer version of the System file with an older version without replacing the Finder file, too.

INITs: Luxuries That'll Cost You

Everyone likes to splurge on a luxury item now and then. But luxuries do erode the bank balance, meaning that there's less left over for necessities. INITs—pieces of software that load when the Mac starts up—are the luxury items of the Mac world. They enhance the Mac's operation by providing such features as electronic mail and customized keyboard shortcuts

THE PRICE OF LUXURY

INIT Name	Developer	Purpose	Memory Used
TOPS 2.1	Sun Microsystems	Network file server	110K
Timbuktu 3.0	Farallon Computing	Network remote control	107K
QuickMail 2.0	CE Software	Network electronic mail	82K
Microsoft Mail 2.0	Microsoft	Network electronic mail	80K
MacroMaker 1.0.1	Apple Computer	Mouse and keyboard automation	50K
MasterJuggler 1.5	ALSoft	System resource management	48K
QuickKeys 1.2	CE Software	Mouse and keyboard automation	33K
Tempo II 1.02	Affinity Microsystems	Mouse and keyboard automation	25K
Shortcut 1.0	Aladdin Systems	File locator	20K
SuperLaserSpool 2.0	SuperMac Technology	Print spooler	16K
AppleShare 2.0.1	Apple Computer	Network file server access	15K
Suitcase II 1.2	Fifth Generation Systems	System resource management	12K
Pyro 3.0	Fifth Generation Systems	Screen blanker	3K
SuperClock 3.3	Steve Christensen	Menu bar clock and stopwatch	2K
Capture 2.0	Mainstay	Screen image capture	2K
Easy Access 1.0	Apple Computer	Keyboard control of pointer	1K

(see "Start with Utilities," *Macworld*, October 1989, and "Getting Started with Utilities," February 1990). But every INIT you use reduces the memory available for applications.

Here are some ways you can balance an appetite for luxuries against the need to pay the bills.

- Think twice about running memory-hungry INITs on a 1MB system. Examples of such INITs include system resource managers such as Suitcase II and MasterJuggler, electronic mail software such as QuickMail and Microsoft Mail, and network software like TOPS and Timbuktu. If you can't live without one or more of these products, you'll almost certainly need to forgo MultiFinder to avoid going broke. Even then, you'll need to limit yourself to applications that use memory sparingly. "The Price of Luxury" lists the memory requirements of numerous INITs.

- Disable one or more INITs when you need extra memory. One way is to open the System Folder and drag the INITs out onto the desktop (not to the Trash). To tell the INITs apart from the other System Folder files, use the Finder's By Kind command; each INIT is labeled as a Startup document. Restart the Mac after dragging the INITs out of the System Folder.

For an easier way to disable INITs, use an INIT-management utility such as CE Software's Aask (part of the MockPackage Plus Utilities collection), Microseeds Publishing's INITPicker, or Natural Intelligence's Inix (see *Reviews*, *Macworld*, October 1989). Aask displays the approximate amount of memory required by each INIT, making it easy to determine which ones are worth disabling.

Applications: When Smaller Is Better

It helps to cut the tax bill and go light on luxuries, but a smart money manager also shops carefully for the basics. Bargain hunting, discount shopping, even price dickering—these are the best ways to stretch your money.

Similar techniques apply to stretching memory. The memory equivalent of bargain hunting involves choosing applications that use memory sparingly. Of the programs in a given category, some need more memory than others. For example,

WHAT'S YOUR VERSION NUMBER?

Macintosh Model	Recommended Versions	Acceptable
128K	System 2.0/Finder 4.1	
512K	System 3.2/Finder 5.3	
512KE	System 3.2/Finder 5.3	System 4.0/Finder 5.4
	System 3.3/Finder 5.4	System 4.1/Finder 5.5
	System 3.4/Finder 6.1 (for use with AppleShare)	
Plus	System 6.0.2/Finder 6.1	System 3.2/Finder 5.3
	System 6.0.3/Finder 6.1	System 3.3/Finder 5.4
	System 6.0.4/Finder 6.1	System 4.0/Finder 5.4
		System 4.1/Finder 5.5
SE		System 4.2/Finder 6.0
	System 6.0.2/Finder 6.1	System 4.0/Finder 5.4
	System 6.0.3/Finder 6.1	System 4.1/Finder 5.5
SE/30	System 6.0.4/Finder 6.1	System 4.2/Finder 6.0
II	System 6.0.2/Finder 6.1	System 4.1/Finder 5.5
	System 6.0.3/Finder 6.1	System 4.2/Finder 6.0
	System 6.0.4/Finder 6.1	
IIfx	System 6.0.3/Finder 6.1	
	System 6.0.4/Finder 6.1	
IICx	System 6.0.3/Finder 6.1	
	System 6.0.4/Finder 6.1	
IIci	System 6.0.4/Finder 6.1	
Portable	System 6.0.4/Finder 6.1	

Microsoft Word runs comfortably in 512K. But Ashton-Tate's portly FullWrite Professional, with its kitchen-sink mix of features, barely fits within 1MB and all but demands 2MB.

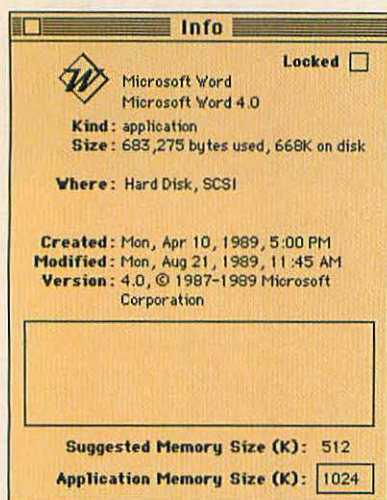
Until customers demand otherwise, the software industry will keep on giving priority to adding features instead of reducing memory requirements. When was the last time you saw a new version of a program debut not with new features but with reduced memory requirements?

But some programs do use memory sparingly.

- For word processing, T/Maker's WriteNow is the unchallenged cham-

pion of memory conservation. It's the only currently shipping word processor I know of that runs on every Mac ever made—even the primordial 128K (if you want to use the program's spelling checker, you'll need 200K). And WriteNow compares favorably with its more corpulent competitors (see "Write, Write, Write," *Macworld*, October 1989).

- For spreadsheet analysis, check out Bravo Technologies' MacCalc. It runs on all Macs from the 512K (enhanced or not) on up and needs just 256K. It's fast, well designed, and packed with features. And its \$139 price can't be beat.



■ For database management, a good choice is Software Discoveries' Record Holder Plus, which requires just 300K. Claris's FileMaker II provides more-complete form-design, scripting, and networking features and runs in

Memory Suggestions

When you choose the Get Info command for an application, the bottom of the Finder's Get Info window displays two memory values. Suggested Memory Size represents the minimum amount of memory the developer recommends (although not necessarily the minimum amount of memory in which the program will run). Application Memory Size reflects the ideal amount of memory. By lowering the latter value, you can reduce a program's memory requirements.

as little as 350K. Microsoft File is a capable filer that runs in as little as 200K. It offers excellent color support and works well with Microsoft Word's print merge features.

■ For personal-finance management, consider Intuit's Quicken. It packs check writing, checkbook balancing, budgeting, and tax record keeping into a compact application that uses only 375K and runs on un-enhanced 512K Macs.

■ For graphics, well, good luck. Graphics programs are inherently memory hungry. For example, Silicon Beach Software's SuperPaint 2.0 needs 700K, and Claris's MacDraw II and

MacPaint 2.0 need 537K and 352K, respectively. And for MacDraw and MacPaint those figures are bare minimums that limit your document size and the number of documents you can open simultaneously. One noteworthy alternative is the DeskPaint and DeskDraw combination from Zedcor—two desk accessories that pack impressive painting and drawing features into the Apple menu.

How can you tell how much memory a program needs? It isn't easy. Software firms rarely list minimum memory requirements on their boxes. They tell you if a program runs on a 1MB machine, but they don't say how much of that 1MB the software actually uses. Determining that requires some detective work on your part.

SLEUTHING THE SIZE RESOURCE

How little memory can you safely allocate to an application? To find out, use ResEdit to examine the application's SIZE resource as follows.

1. Start the Mac using the Finder, not MultiFinder. ResEdit is more reliable when you don't use MultiFinder.
2. In ResEdit's directory window, double-click on the name of the application whose SIZE resource you want to examine. (For safety's sake, work with a backup copy of the application, not the original.) A window appears listing the resources in that application.
3. Locate the SIZE entry and double-click on it. Another window appears containing an entry labeled SIZE ID=-1. SIZE ID=0 may also appear. This second entry is a SIZE resource added by the Finder and indicates that someone has adjusted the application's memory size using the Get Info command. The SIZE ID=0 resource overrides the SIZE ID=-1 resource.
4. Open the SIZE ID=-1 resource by double-clicking on it. A new window appears displaying the contents of the resource. Don't change any entries; you're here to observe only.
5. Scroll to the bottom of the window and locate the two entries labeled Size and Min size (see "Inside SIZE"). The Size value corresponds to MultiFinder's suggested memory size. The Min size value represents the smallest amount of memory in which the application can reliably run. This value is in bytes; to convert it into kilobytes—the format required by the Get Info window—divide it by 1024. For example, the value 393216 represents 384K. Write down this minimum number.
6. Quit ResEdit. If you're asked to save changes, answer No.
7. Use the Finder's Get Info command to change the application memory size to match the minimum value you wrote down in step 5. Close the Get Info box to save your changes. At this point, you may want to start the Mac under MultiFinder and test the application's performance by opening it and performing the tasks you usually perform.

Sizing Up Software

If a computer dealer will let you experiment, you can use two techniques to determine a program's memory requirements. The easiest technique involves selecting the application's icon and then choosing the Finder's Get Info command. Two values appear at the bottom of the Get Info window: the program's suggested memory size, the minimum amount its developer recommends, and its application memory size, the ideal amount its developer recommends (see "Memory Suggestions").

The suggested memory size is usually less than the application memory size. Sometimes, however, the two values are the same, as is the case with SuperPaint 2.0, MacWrite II, and FileMaker II, to name a few. In any case, the suggested memory size is the value to watch, since it reflects a realistic minimum. The suggested memory size is the minimum amount of memory the developer recommends for acceptable performance and reliability. Don't confuse this with the *minimum memory size*—a more dubious figure indicating a theoretical minimum that may yield poor performance or prove unreliable.

Both the *application memory size* and the *suggested memory size* come from a *resource* stored within the application file. This resource, aptly named SIZE, contains information that the Mac uses to determine how the program runs under MultiFinder.

When you start a program, MultiFinder consults the program's SIZE resource to determine how much memory the program would like to have and how much it will settle for if that ideal amount isn't available. If less than the ideal amount is available, MultiFinder determines if at least the minimum amount is available. If it is, a dialog box appears asking if you want to run the program within that amount. If even the minimum amount isn't available, MultiFinder informs you that the program couldn't be opened and suggests quitting another application to free up memory.

"Sleuthing the SIZE Resource" describes how to examine an application's SIZE resource by using Apple's ResEdit utility. ResEdit is available through APDA (the Apple Programmer's and Developer's Association) and also through user groups and on-line services such as CompuServe.

Dickering with Applications

You can't change an application's suggested memory size (actually, you can with ResEdit, but the application may rebel). However, you can change the application memory size by simply typing a new value in the Get Info window. By lowering the application memory size, you talk the program into accepting less memory. It's price dickering, software style, and it increases your chances of being able to run your favorite programs simultaneously under MultiFinder.

But how much of a change should you make? That depends.

- If the application memory size is greater than the suggested memory size, you can safely reduce the application memory size to match the suggested memory size.

- If both memory-size values are identical, you can try reducing the application memory size, but the program may not run reliably. Because the potential for problems exists, the Finder asks for verification when you supply an application memory size

APPLICATION MEMORY SIZES				
Application	Suggested Memory Size	Application Memory Size	Minimum Memory Size	Disk Space
Aldus FreeHand 2.0	750K	1200K	700K	700K
Aldus Persuasion 1.0	800K	800K	800K	753K
Aldus PageMaker 3.0	700K	700K	700K	890K
Business Filevision 1.5	288K	288K	148K	286K
Business Sense 1.0	512K	512K	384K	256K
CA-Cricket Draw 1.1.1	768K	768K	668K	313K
CA-Cricket Paint 1.0	1000K	1000K	750K	318K
CA-Cricket Presents 1.0	1024K	1024K	1024K	528K
DiskFit 1.5	512K	512K	448K	181K
FileMaker II 1.1v2	512K	512K	350K	393K
FoxBase +/Mac 1.0	1024K	1024K	1024K	568K
Full Impact 1.0	1024K	1024K	1024K	522K
FullWriteProfessional 1.0	1124K	1124K	1024K	773K
Graphist Paint II	1611K	1611K	1514K	156K
LaserTalk 1.1	600K	500K	375K	177K
MacCalc 1.2d	272K	304K	256K	182K
MacDraw II 1.1	900K	900K	537K	467K
MacPaint 2.0	512K	512K	352K	147K
MacProject II 1.0	384K	384K	256K	209K
MacWrite II 1.1v1	800K	800K	590K	451K
Mathematica 1.2	3072K	3072K	512K	679K
Microsoft Excel 2.2	1024K	1024K	512K	728K
Microsoft File 2.0	384K	384K	200K	201K
Microsoft PowerPoint 2.0	800K	800K	380K	401K
Microsoft Word 4.0	512K	1024K	384K	668K
Microsoft Works 2.0	768K	768K	224K	587K
Modern Artist 2.0	1200K	1200K	1200K	249K
More II 2.0	1024K	1024K	700K	733K
Nisus 2.02	700K	900K	700K	555K
Panorama 1.0	976K	976K	512K	320K
PixelPaint 2.0	2560K	1800K	1800K	762K
Plus 1.1	1953K	1953K	1953K	548K
QuarkXPress 2.0	992K	992K	992K	762K
Quicken 1.5	375K	375K	375K	201K
ReadySetGo 4.5	1024K	1024K	800K	506K
ReadySetShow 1.0	800K	800K	800K	458K
Record Holder Plus 3.1	300K	300K	300K	187K
Reflex Plus 1.0	350K	350K	350K	251K
SoundEdit 2.0	1024K	1024K	256K	262K
Springboard Publisher II	900K	900K	600K	625K
SuperCard 1.0	735K	1600K	735K	345K
SuperPaint 2.0	700K	700K	700K	505K
WordPerfect 1.0.2	600K	600K	400K	317K
WriteNow 2.0	400K	400K	200K	102K

that's below that suggested memory.

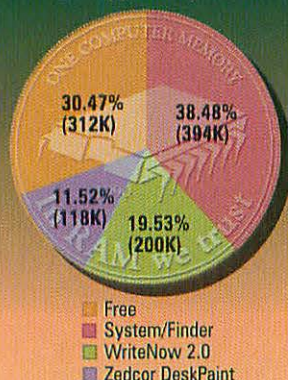
What are the effects of reduced memory sizes? The program will probably run slower, and it will access the disk more frequently as it loads and discards portions of program code in order to fit within its cramped confines. If the program keeps open docu-

ments entirely in memory (Microsoft Works and drawing and painting programs do), you'll be restricted to smaller documents, and you won't be able to have as many documents open simultaneously.

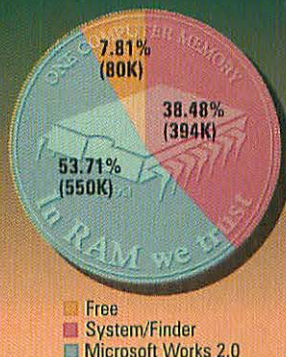
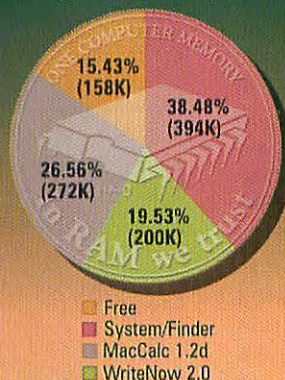
Incidentally, if you can spare the memory, you can boost a program's

TEAMS FOR COMMON TASKS

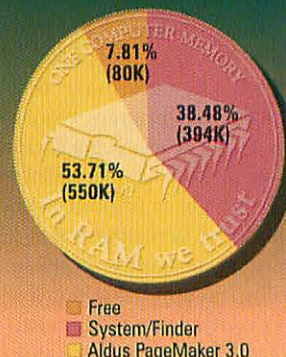
Shown as a percentage of total RAM. Actual memory shown in parenthesis

Word Processing with
Bitmapped Graphics

Integrated Application

Word Processing with
Spreadsheet Analysis

Desktop Publishing



Here are four ways you can combine programs under MultiFinder to perform common tasks. The numbers in parentheses following each program indicate how much memory you should give that program using the Finder's Get Info command. (Technically, PageMaker's minimum memory requirement is 700K, but the program appears to run reliably in 550K. You might also consider Timeworks' Publish It for desktop publishing; it even runs on a 512KE Mac.) For tasks requiring database management, such as producing personalized form letters, consider an integrated package such as Microsoft Works, or Software Discoveries' Record Holder Plus, which can run in as little as 300K. Note that you may need to fine-tune some memory values depending on your system configuration. For example, if you want to use MultiFinder's background printing option, be sure that at least 80K remains free. The 394K value for the System and Finder assume the use of the System 6.0.2 minimal installer script for a 1MB Mac SE.

performance by giving it more memory. For programs that keep open documents in memory, this lets you create larger documents and have more of them open simultaneously.

Putting Theory into Practice

It's easy to talk about experimenting with memory size, but many people lack the time or inclination to do so. For this group, "Application Memory Sizes" lists the memory-size values of popular programs, and "Teams for

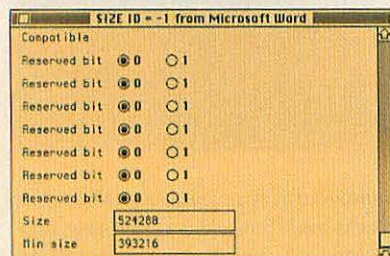
Common Tasks" lists some program combinations, memory size, and disk space requirements for popular tasks.

I've concentrated on memory limitations here, but disk space may also be a factor. If you don't have a hard disk, you need to do some careful organizing to be able to store programs, system files, and documents. Your job will be relatively easy if your Mac has 1.4MB SuperDrive floppies and downright daunting if it has the original 400K drives. The Mac's system software includes an installation program that creates a stripped-down System Folder designed for floppy-only systems. In the System Update 6.0 package, these minimal installers are on the Macintosh Utilities Disk 1.

Finally, a word to owners of unenhanced 512K Macs: upgrade. The shadow of obsolescence is fast approaching; soon you may have no new programs to choose from. Upgrading to a 512KE opens the doors to many popular applications. A Plus upgrade is better still, although you can buy a 512KE upgrade and add a non-Apple

SCSI port and memory upgrade to get a cheaper equivalent of a Plus (see "Is Your Mac Obsolete?" in the February 1990 issue). The same do-it-yourself price advantages apply to upgrading a 128K Mac.

Is it right for software firms to continue releasing ever-larger programs with more and more features? Yes, if that's what customers want. But companies should be up front about listing memory requirements. The minimum amount of memory required for a program should appear on its box, allowing you to determine whether a program will be able to coexist under MultiFinder with the other programs you run. After all, you can't put a system together unless you know whether its pieces are going to fit. **M**



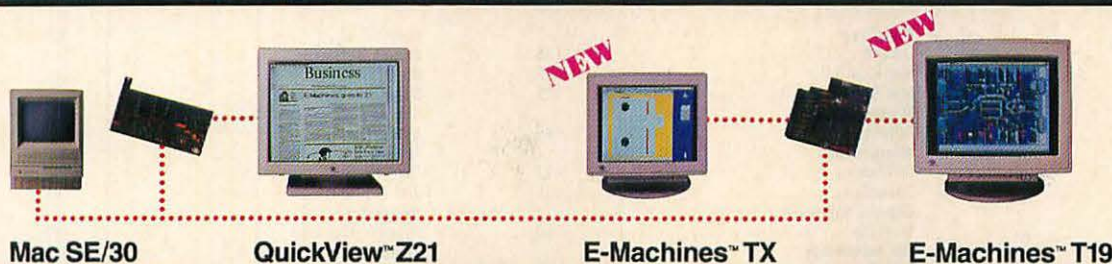
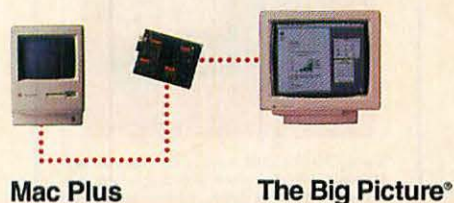
Inside SIZE

In the SIZE resource, the Size value corresponds to MultiFinder's suggested memory size. This value is in bytes; divide the Min size value by 1024 to convert it to kilobytes.

Jim Heid is a Macworld contributing editor and columnist. He recently coauthored Inside the Apple Macintosh (Brady, 1989) with Peter Norton. He would like to thank Dennis Coben for technical assistance with this article.

More Choice . . .

For Every Macintosh



A Complete Family of
Monochrome, Gray Scale
and Color Display Systems

Find out where to buy
Call (800) 34-GRAPHIC



E-MACHINES
Power to See Your Best

Circle 101 on reader service card

9305 SW Gemini Drive, Beaverton OR, 97005 (503) 646-6699
©1989 E-Machines. E-Machines and ColorPage are trademarks of E-Machines, Inc.



Scott Watson's incredible successor to the legendary Red Ryder program. The new features list runs over 20 pages. Now comes with Oktyo, a revolutionary Mac to Mac file transfer program.
White Knight Ver. 11.04 by FreeSoft \$85.00



MacEnvelope 4.1 is an envelope/label printing program incorporating postal bar coding to speed delivery and sale on postage for large mailings. MacEnvelope plus for large list management with a list capacity of 100,000 names.
MacEnvelope 4.1, \$85.00
and MacEnvelope Plus, ... \$179.00 by Synex



Use MICRO PLANNER to get a clear picture of their schedule, budget or other data using bar graphs, histograms, progress reports and more. Import and export from popular programs.
MICROPLANNER by MICRO PLANNING INTERNATIONAL \$325.00

PROGRAMS PLUS

FAX: 203/381-9043
 Inquiries: 203/378-3662
 75 RESEARCH DRIVE
 STRATFORD, CT 06497

1/800/832-3201 (USA)
1/800/344-7753 (Canada)

Utility Software

1st Aid Software	
Complete Undelete	37.
Abbott Systems, Inc.	
CanOpener v1.1.	65.
Affinity Microsystems	
Tempo II.	75.
Aladdin Systems	
Shortcut.	46.
ALSoft	
Master Juggler or Disk Express II.	64.
Font/DA Juggler Plus.	42.
Berkeley System Design	
After Dark.	25.
Stepping Out II.	50.
Caero	
Omnipage.	545.
Casady & Greene, Inc.	
QuickDex 1.4A.	31.
CE Software	
QuickKeys or DiskTop v4.0.	64.
MockPackage Plus Utilities.	42.
Calendar Maker.	32.
Central Point Software	
Copy II Mac v7.2.	22.
Dantz Software Development	
Retrospect v1.1.	149.
Dayna Communications	
DosMounter.	55.
Dubi-Click	
Calculator Construction Set v2.0.	45.
Fifth Generation Systems	
FastBack II or DiskLock.	107.
Suitcase II.	44.
HJC	
Virex.	59.
Icom Simulations	
On Cue.	35.
Insight Development	
MacPrint v1.2.	95.
Jam Software	
Smart Alarms W/ Appt.	49.
Kent Marsh	
KnightWatch.	87.
Loop Software	
PictureBook.	39.
Magic Software	
Auto Save II.	28.
POWERICONS or POWERmenus.	39.
Back-Matic.	49.

MainStay	
Capture.	45.
Mac Flow 3.0.	125.
Mac Schedule v2.0.	129.
Microlytics, Inc.	
GOfer v2.0.	45.
Microseeds	
INITPicker.	27.
ScreenGems.	39.
Olduvai Software	
MultiClip.	50.
ON Technology	
On Location.	75.
Peripheral Land	
TurboCache or TurboSpool.	69.
Solutions, International	
SmartScrap & The ClipperII V2.0.	45.
Super Glue II v2.01.	61.
SuperMac Software	
SuperSpool 5.0 or Diskfit 1.5.	58.
SuperLaserSpool 2.0 or Sentinel 2.2.	87.
Symantec	
Symantec Utilities for Mac (SUM II).	95.
Symantec AntiVirus for Mac (S.A.M.I.).	63.
Synex	
Mac Envelope 4.1.	SPECIAL 85.
Mac EnvelopePlus v1.0.	SPECIAL 179.

HyperMedia & Languages

Activision	
Reports for Hypercard.	65.
Apple Computer	
HyperCard.	42.
Borland	
Turbo Pascal.	68.
Broderbund	
Whole Earth Catalogue (CD ROM).	89.
Digitalk, Inc.	
Smalltalk/vmac.	125.
Hyper Press	
Script Expert.	45.
Icom Simulations	
HyperTMON.	59.
TMON.	88.
Microsoft	
Quick Basic.	65.
Millennium Software	
HyperX.	65.
Silicon Beach	
SuperCard.	125.
Smothers Barnes	
Prototyper.	185.
SoftStream	
Authenticate w/ Mutate.	85.

HyperHIT v2.2.	123.
Somak Software	
ScriptEdit.	49.
Spinnaker Software	
Olduvai Plus.	109.
Symantec	
Think C.	155.
Think Pascal.	95.
Just Enough Pascal.	47.
Symmetry	
HyperDA (Reg. 512k).	49.
TENpointO	
FocalPoint II.	117.
the Result Software	
Dialoger.	69.

Numbers & DataBase Management

Acius	
4th Dimension v2.0.	469.
Blyth Software	
Omnis 5.	SPECIAL 347.
Chang Laboratories	
C.A.T.	225.
Claris	
FileMaker II.	219.
MacProject II.	369.
Fox Software	
FoxBASE + Multi-User v2.0.	399.
FoxBASE + v2.0.	295.
FoxBASE + Runtime v2.0.	179.
Informix	
Wingz v1.1.	249.
MICRO PLANNING INTERNATIONAL	
MICRO PLANNER 6.1.	SPECIAL 325.
Microsoft	
Microsoft Works 2.0.	185.
Microsoft Excel 2.0.	249.
Microsoft Office.	529.
Odesta	
Double Helix III.	329.
DataDesk Professional v3.0.	329.
GeoQuery.	198.
Paracomp	
Milo.	155.
Preferred Publishers	
Database.	69.
Satori Software	
Bulk Mailer 3.3.	75.
Bulk Mailer Plus.	185.
SoftStream	
Endeavour Planning.	95.
Symmetry	
KeyPlan.	245.
Synergy	
KaleidaGraph.	139.

**Now on Compuserve-
GO PP Genie-GOPP**

Stock, Speed, Support, Price



atOnce! is the next generation in high-speed small business accounting. Included in one seamless integrated module are four full-featured applications: General Ledger, Accounts Receivable w/Billing, Accounts Payable & Payroll.
atOnce! by Layered..... \$289.00



A full-featured 2400 baud modem with 4800 baud group three send-only fax capability. Includes a cable, a custom version of BackFax software and online starter packages.
Promodem 2400m Fax by Prometheus \$209.00



All the power needed for even the largest databases is yours with Omnibus 5. Files of up to 2560 megs are possible. This latest version includes many new features.
Omnibus 5 by Blyth Software..... \$347.00

PROGRAMS PLUS

FAX: 203/381-9043
Inquiries: 203/378-3662
75 RESEARCH DRIVE
STRATFORD, CT 06497

1/800/832-3201 (USA)
1/800/344-7753 (Canada)

Systat
Systat v5.0 (Specify MacPlus, SE or Mac II). . . . 485.
Fastat (Specify MacPlus, SE or Mac II). . . . 165.

Word Processors & Desktop Publishing

Adobe
ATM (Adobe Typeface Manager). . . . 56.
ATM + (Adobe Typeface Manager Plus Pak). . . . 109.
Adobe Illustrator w/ ATM. . . . 279.
Streamline or Newsletters. . . . 229.
TrueForm Fill-Out. . . . 169.
TrueForm Set-Up. . . . 225.
Adobe Type Libraries vol 1 Thru 117 (Each). . . . CALL
Advanced Software
DocuComp. . . . 88.
A Lasting Impression
ResumExpert. . . . 38.
Aldus Corporation
Color Extension. . . . 135.
Aldus Persuasion or Freehand. . . . 339.
PageMaker 3.02. . . . 385.
Altisys, Corp.
Fontographer 3.0. . . . 249.
Antic Software
Flexforms Business Template 1 or 2. . . . SPECIAL 49.
Ashton Tate
FullWrite Professional or Full Impact. . . . 249.
Broderbund
DTP Advisor. . . . 47.
Claris
MacWrite II. . . . 169.
Computer Assc.
Cricket Graph v1.31. . . . 125.
Data Translation
PhotoMac. . . . 469.
Design Science
Math Type 2.0. . . . 95.
Dubi-Click Software
World-Class Lasertype vol. 1 Thru 9 (each). . . . 42.
Emerald City
Type Align. . . . 60.
Farallon Computing
Screen Recorder. . . . 125.
MacRecorder v2.0. . . . 159.
Letrasot
Design Studio. . . . 619.
Ready Set Go! 4.5. . . . 269.
Letra Studio or Image Studio v1.5. . . . 269.
Microsoft
Microsoft Word 4.0 or PowerPoint 2.1. . . . 249.
Now Horizon
Word Maker. . . . 65.
Niles & Assc.
EndNote. . . . 75.

Olduvai Software
Read-It! OCR 2.1. . . . 239.
Paragon Concepts
Nisus v3. . . . 245.
Portfolio Systems
DynoDex. . . . 89.
Power Up
Calendar Creator. . . . 38.
Address Book Plus (Book Binder). . . . 85.
Fast Forms. . . . 89.
Preferred Publishers
Vantage or Exposure. . . . 52.
Prescience
Expressionist 2.03. . . . 79.
Quark, Inc.
QuarkXPress v2.12. . . . 449.
QuarkStyle. . . . 169.
Spinnaker Software
Top Honors. . . . 59.
Springboard Publisher II. . . . 109.
Symantec
More II. . . . 249.
Symmetry
Acta Advantage. . . . 65.
T/Maker Company
WriteNow v2.2. . . . SPECIAL 119.
TimeWorks
Publish-It. . . . 219.
Word Perfect Corporation
Word Perfect v1.03. . . . 229.
Working Software
QuickLetter. . . . 73.
Xerox Imaging Systems
AccuText. . . . 545.

Spelling & Grammar Checkers

Deneba Software
Spelling Coach 3.1 Professional. . . . 125.
Big Thesaurus. . . . 65.
Electronic Arts
Thunder! II. . . . 49.
Lexortiso
Mac Proof. . . . 115.
Microlytics, Inc.
Word Finder (Synonym Finder). . . . 34.
Electronic Word Finder. . . . 59.
Reference Software
Grammatik. . . . 52.
Sensible Software
Sensible Grammar or BookEnds. . . . 51.

Disk Drives/Hard Disks/ Upgrades/Keyboards

1 Meg SIMMS

CALL

Avatar Technologies
Main Frame II. . . . 725.
CMS
MacStack SD20U Mac+ ,SE, II). . . . 449.
MacStack SD30U Mac+ ,SE, II). . . . 499.
Cutting Edge
Cutting Edge MCK-105QK KB w/ Quickeys. . . . 133.
Cutting Edge 800k Drive. . . . 149.
20 + Meg Hard Drive. . . . 359.
30 + Meg Hard Drive. . . . 469.
45 + Meg Hard Drive. . . . 519.
Dayna Communications
Daynafile DF0100 Single. . . . 499.
Daynafile DF0102 Dual. . . . 695.
DataDisk
Hyper Dialer. . . . 29.
MAC-101 Keyboard or ADB Keyboard. . . . 136.
Howlett Packard
CALL
Kennect Technology
Rapport w/ Fastback II. . . . 199.
Drive 2.4. . . . 329.
Key Tronic
Mac Pro Keyboard w/ Tempoll. . . . SPECIAL 119.
Mass Micro Systems
Datapak. . . . 1185.
Data Cartridge (Single). . . . 125.

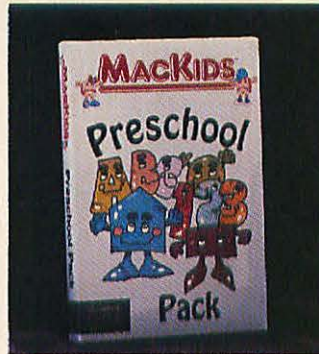
Modems

Abaton
InterFax 12/48. . . . 265.
InterFax 24/96. . . . 419.
Anchor Automation
MacPac 2400E w/ software & cable. . . . 169.
Applied Engineering
DataLink Express. . . . 189.
Hayes Microcomputing
Smartmodem 2400M w/ smartcom II. . . . 429.
Smartcom II 3.1. . . . 85.
Practical Peripherals
Practical Modem 2400SA. . . . 179.
MacCompack (2400SA w/ Microphone & Cable). . . . 225.
Prodigy Service Co.
Prodigy Modem Kit 2400. . . . 159.
Prometheus
Promodem 2400M Ext.. . . . 199.
Promodem 2400SE Int.. . . . 209.
Promodem 2400MII Int.. . . . 269.
Promodem 9600M Plus Ext.. . . . 750.
Promodem 2400M Fax. . . . 209.
MacKNOWLEDGE. . . . 139.
Shiva
NetModem V2400. . . . 395.
Supra Corporation
Supra Modem 2400. . . . 115.

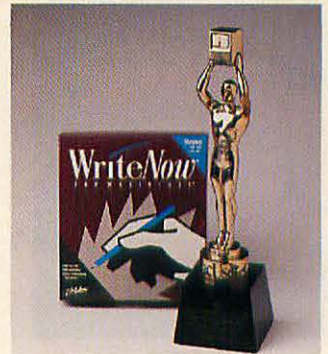
Your Business Plus is PROGRAMS PLUS



Increase your productivity with KeyTronic's new ADB-compatible 105-key MacPro keyboard. Features extended-style layout, dual-legend keycaps and free Tempo II™ Macro Software. Backed by a three-year warranty and toll-free product support. **MacPro Keyboard by KeyTronic . . . \$119.00**



Six educational lessons in color that teach your child the ABC's, shapes, counting, and more in a fun and exciting manner. Ten additional MacKids programs are available in B/W. **Preschool Pack by Nordic Software . . \$49.00**



The new version of the easy-to-use, easy-to-learn, powerful word processor. Now has a 135,000 word dictionary, compatible with other major programs, and lots more. **WriteNow 2.2 by T/Maker . . . \$119.00**

PROGRAMS PLUS

FAX: 203/381-9043
Inquiries: 203/378-3662
75 RESEARCH DRIVE
STRATFORD, CT 06497

1/800/832-3201 (USA)
1/800/344-7753 (Canada)

Accounting Packages

Aatrix Software	
Aatrix Checkwriter v2.0.	35.
Chang Labs	
Rags to Riches 3-Pack 3.1 (GL / AR / AP).	285.
Check Mark	
MultiLedger.	235.
Payroll.	175.
Cash Ledger.	115.
Computer Asoc.	
Simply Accounting.	219.
Digital Etc.	
Business Sense.	SPECIAL 269.
Intuit	
Quicken v1.5.	36.
Layered	
Insight One Write.	99.
At Once!.	SPECIAL 285.
Insight Expert INV or Time Billing.	395.
Insight Expert GL, AR, AP or Payroll.	395.
MECA	
Managing Your Money.	124.
Money Magazine (Reality Software)	
Wealth Builder.	149.
Monogram	
Dollars & Sense 4.1c.	81.
Nolo Press	
WillMaker 3.0.	32.
ProPlus Software	
WallStreet Investor v3.0.	395.
Satori Software	
Components GL.	369.
SoftView	
MacInTax.	65.
Survivor Software	
InvoicIt.	49.
MacMoney 3.0 (Enhanced Version).	59.
Timeslips	
Timeslips III.	169.

Graphics & Design Software

3G Graphics	
Images w/ Impact Graphics & Symbols.	51.
Images w/ Impact Business 1.	65.
Abracadata	
Design Your Own Home Architecture.	SPECIAL 49.
Altsys Corp.	
Art Importer.	89.
Metamorphosis.	149.
Bright Star Technology	
Hyper Animator.	98.

**Now on CompuServe-
GO PP Genie-GOPP**

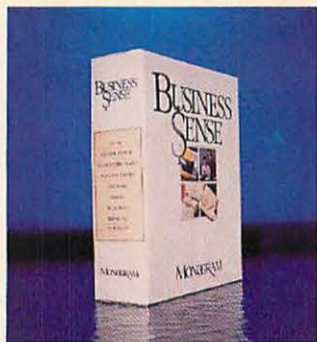
InterFace.	249.
Broderbund	
Print Shop.	35.
TypeStyler.	119.
Claris	
MacPaint II.	95.
Smartform Designer.	285.
MacDraw II.	295.
Claris Cad.	595.
Custom Applications Inc.	
Freedom of Press.	259.
Deneba Software	
Ultra Paint.	125.
Canvas 2.1.	189.
Dubi-Click Software	
World-Class Fonts vol. 1 & 2 Thru 7 & 8 (each).	42.
WebPaint vol. 1 & 2 Thru 17 & 18 (each).	42.
Electronic Arts	
Studio II (MacII).	295.
Studio 1.	96.
Emerald City	
Smart Art I, II or III.	84.
Foundation Publishing	
Comic People.	21.
Comic Strip Factory.	38.
Generic Software	
Generic CADD.	84.
Generic CADD Libraries (each).	CALL
Graphsoft	
Blueprint.	295.
Mini Cad +.	499.
Innovative Data Design	
MacDraft 1.2B.	169.
Dreams.	299.
I.S.I.	
Precision.	155.
Kaetron Software	
Top Down.	185.
LetraSet	
Font Studio.	469.
MacroMind	
VideoWorks II.	175.
MacroMind Director.	445.
MathSoft	
MathCAD.	305.
Metro ImageBase	
Various Fonts (each).	75.
Micro: Maps	
MacAtlas Paint v2.0.	45.
MacAtlas Professional (PICT / MacDraw Version).	105.
MacAtlas Presentation Pack.	105.
Micro Spot	
MacInteriors.	185.
MacPlot Pen Plotter Professional.	259.
MacPlot Pen Plotter Standard.	133.

Paracomp	
Swivel 3D v1.1.	299.
Model Shop.	369.
Select Micro Systems, Inc	
MapMaker v4.0.	239.
Silicon Beach	
Super Paint 2.0.	125.
Super 3D 2.0.	315.
Solutions International	
The Curator v1.05.	72.
Strata	
Stratavision 3D.	375.
SuperMac Software	
Pixel Paint v2.0.	225.
Pixel Paint Professional.	389.
Tactic Software	
Art Clip or ArtFonts 1, 2 or 3.	49.
Art Clip vol 2.	65.
Zedcor	
DeskPaint 2.0.	64.

Educational/Creative Software

Ars Nova	
Practica Musica v2.2.	72.
Broderbund	
Sensei Geometry, Calculus or Physics.	58.
Where in the World is Carmen SanDiego?.	27.
Where in Europe is Carmen SanDiego?.	29.
Where in the USA is Carmen SanDiego?.	29.
Jam Sessions.	29.
Carina Software	
Voyager v1.2.	85.
Coda	
Macdrums.	31.
Perceive.	49.
Finale.	469.
Electronic Arts	
Mavis Beacon Typing.	32.
Deluxe Music Construction Set V2.5.	84.
Deluxe Recorder.	95.
Hip Software Corp.	
Harmony Grid.	59.
Hook Up.	89.
Learning Company	
Reader Rabbit.	31.
Math Rabbit.	31.
Meta Comet	
Accu-Weather Forecasters.	57.
Nordic	
Educational Series: (each).	28.
PreSchool Pack.	SPECIAL 35.
Pelican Software	
Monsters & Make Believe.	24.
Dinosaur Days.	24.

Stock, Speed, Support, Price



Business Sense Ver. 1.3 is an easy-to-use complete accounting system for the small to medium business. Comes with the interactive tutorial "Teach Yourself Essentials of Accounting" by Addison-Wesley Publishing.
Business Sense by Digital Etc. \$269.00



Two separate collections of popular business forms. Print camera ready forms, include auto date fields, import data and print multiple part forms with SmartForm Assistant (included).
Flexforms Business Templates 1 or 2 by Antic Software \$49.00 each



DESIGN YOUR OWN HOME, ARCHITECTURE, lets you create floorplans, elevations and structural details using architectural standards. Automatically calculates distances, angles, and areas; prints out to scale and allows for custom shapes.
D.Y.O.H. Architecture by Abracadata \$49.00

PROGRAMS PLUS

FAX: 203/381-9043
Inquiries: 203/378-3662
75 RESEARCH DRIVE
STRATFORD, CT 06497

1/800/832-3201 (USA)
1/800/344-7753 (Canada)

Penton Overseas

VocabuLearn / ce Spanish, French, German or Italian (Level 1 or 2). 30.
VocabuLearn / ce Japanese (Level 1 or 2). 36.

Blank Media & Ribbons

Bulk (Sony) 3 1/2" DS / DD (10). 14.
Sony 3 1/2" DS / DD Disks (box of 10). 14.
Sony 3 1/2" DS / HD (10). 25.
Verbatim 3 1/2" DS / HD (10). 29.
Ribbons
ImageWriter Ribbon. 4.
ImageWriter Rainbow Pack (6 Colors). 20.
ImageWriter II-Four Color Ribbon. 9.

Printers, Digitizers & Monitors

Apps
Micro TV (MacII). 275.
Complete PC
Complete Half Page Scanner. 309.
Complete Full Page Scanner. 749.
Cutting Edge
Two-page Display Monochrome Monitor. 935.
Digital Vision
Computer Eyes-Mac. 195.
Computer Eyes-MacII Color. 349.
GDT Software
Print-Link Collection. 59.
JetLink Express. 89.
Kaala Technologies Corp.
MacVision 2.0 (Digitizer). 219.
Kurta
IS ADB Tablet 8 1/2 x 11. 245.
IS ADB Tablet 12 x 12. 359.
LogiTech
ScanMan. 319.
Magnavox
Color Monitor 14". 535.
Microtek Lab, Inc.
Mac Interface Kit. 369.
MSF-300Z Color / Gray Scale. 1625.
Seikosha
SP1000 (Imagewriter Compatible). 229.
ThunderWare
LightningScan. 369.
ThunderScan. 185.

Accessories

Advanced Gravis
Mouse Stick (Plus or ADB). 85.
American Power Conversion
110SE UPS. 269.
CalComp
Wiz. 149.

Ergotron
MacTilt (Mac, SE, or II). 68.
Muzzle SE. 62.
Muzzle MacII. 68.
I/O Design
Mac Plus Carrying Case. 59.
MacSE Carrying Case. 75.
Kalmar Designs
Micro Cabinet (holds 45 disks). 14.
Double Micro Cabinet (holds 90 disks). 21.
Triple Micro Cabinet (holds 135 disks). 31.
Kensington
Apple Security Kit. 34.
Antiglare Polarizing Filter. 33.
Mac II Stand and Cable Kit. 64.
Printer Muffler 80. 43.
System Saver Mac (Beige or Platinum). 63.
Super Base. 34.
Masterpiece Mac II. 105.
New Turbo Mouse (Reg. or ADB). 109.
Apple Color Monitor or Full Page Display Polarizing Filter. 63.
Two Page Display Polarizing Filter. 135.
Mobius
Fanny Mac QT. 59.
Mouse Systems
A+ Mouse (MacPlus). 59.
A+ ADB Mouse (Mac SE / Mac II). 79.
Practical Solutions
Mouse Master. 35.
Cordless Mouse. 99.

Networking Software & Hardware

Beagle Bros.
Flash. 119.
Compuserve
Compuserve Starter Kit. 24.
Compuserve Navigator v2.1. 39.
DataViz
MacLink Plus / Translator. 99.
MacLink Plus with Cable. 119.
Farrallon
PhoneNET Din 8 or DB9. 33.
Timbuktu. 95.
TrafficWatch or Timbuktu Remote. 125.
Portable Pack. 339.
Freesoft
White Knight v.11.04. SPECIAL 85.
Infosphere
Liaison. 169.
Insigna
SoftPC v1.3. 245.

Microcom Software

Carbon Copy (Twin Pack). 179.
Microsoft
Microsoft Mail Mac Work Station. 84.
Microsoft Mail Mac Server. 249.
Nuvotech
TurboBridge. 319.
NuvoLink SC. 329.
Turbo Star. 1359.
NuvoLink II. CALL
Prodigy Service Co.
Prodigy Start-up Kit. 27.
Shiva
Net Serial X232. 269.
Net Bridge or TeleBridge. 329.
Solutions, International
BackFax v1.02. 124.
Fox Gate Plus. 229.
Synergy Software
VersaTerm. 88.
VersaTerm-Pro. 174.
Travelling Software
LAP-LINK Mac Connectivity Pac. 119.
LAP-LINK Network Pac v3.0. 189.
TOPS
Tops Repeater. 122.
Tops FlashCard. 155.
Tops Network Bundle v3.0. 189.
InBox / Mac Administrator 20 user. 215.

OUR POLICY

- VISA and MASTERCARD accepted. No surcharge. Your credit card is not charged until we ship.
- If we ship a partial order shipment that completes is sent free.
- All shipments insured; no additional charge.
- Upon receipt and approval, personal and company checks now clear the same day for immediate shipment.
- No sales tax except orders shipped within CT add 8% tax.
- COD maximum \$1000, cash or certified check. COD orders ship via UPS Blue Label unless UPS Ground delivers next day.
- 120 day limited warranty on all products. Defective software replaced immediately. Defective hardware repaired or replaced at our discretion. Prices subject to change without notice. All items subject to availability.
- For purchase orders, corporate purchases, call our business office at 203-378-1926, 9am-5:30pm EST. Purchase orders accepted at our discretion. Shipping on corporate orders billed at cost.

SHIPPING

- Continental U.S.: Add \$3.00 per order to cover Federal Express Standard Overnight Service, unless UPS ground delivers next day. Some areas require an additional day.
- All (in-stock items) ordered by 7:00pm Eastern Time Monday thru Friday will ship that evening for overnight delivery, barring computer failures or other catastrophes.
- Alaska, Hawaii, outside Continental U.S., APO and FPO; call (203) 378-3662 or write for shipping information.
- Mail-in orders (especially from foreign countries), please furnish telephone or fax number.

Your Business Plus is PROGRAMS PLUS

Circle 44 on reader service card



REVIEWS



PostScript Laser Printer

QMS-PS 820 TURBO

Pros: Fast; versatile paper-handling; accepts memory expansions and SCSI hard disk. **Cons:** 8-ppm engine creates a bottleneck with typographically simple documents. **Company:** QMS. **Requires:** Mac Plus. **List price:** \$6995. Additional paper trays \$75 each.



The QMS-PS 820 turbo costs \$4 less than Apple's top-of-the-line LaserWriter IINTX, plus it does more and does it faster. The PS 820 turbo combines excellent performance with versatile paper-handling features. The result is one hot PostScript laser printer—and a strong challenger to the NTX.

The PS 820 turbo uses Canon's LBP-TX print engine, which is similar to the popular LBP-SX engines used in Apple's LaserWriter II models and in the QMS-PS 810. Both engines produce 300-dots-per-inch output, both have a maximum print speed of 8 pages per minute (ppm), and both are easy to set up: simply remove the packing material and slide a mess-free disposable toner cartridge (good for about 4000 pages) into place.

But instead of just one 200-sheet paper tray, the TX has two. You can put letterhead in one tray and second sheets in the other. Or, one tray can hold letter-size paper and the other legal-size stock, or envelopes. Or you can put the same paper in both trays and set up the printer to switch trays when the first one empties. A front-panel status display shows which tray is active. (The PS 820 turbo comes with two letter-size trays.)

The PS 820 turbo provides three connection ports: LocalTalk, RS-232C serial, and Centronics parallel. Apple's



QMS-PS 820 turbo

PostScript printers don't have the Centronics port, which is generally used to connect to IBM PCs. The rear-panel thumb switch makes choosing the active port a breeze; Apple uses small, unlabeled DIP switches.

It's Smart, Too

The driving force behind the PS 820 turbo's TX engine is a high-performance Adobe Discovery controller containing a 68020 processor running at 20MHz. The LaserWriter IINTX and Dataproducts' slick LZR-1260 both contain a 68020, but they run at a slower 16MHz (see "Paging All Printers," *Macworld*, October 1989). The PS 820 turbo's faster processor enables it to outpace its competitors when printing complex illustrations or documents containing numerous fonts and type sizes (see "Testing the Turbo").

When printing typographically simple documents, however, such as double-spaced manuscripts formatted

in Courier, the PS 820 turbo falls victim to its engine's 8-ppm maximum printing speed. With simple documents, the PS 820 turbo finished behind even the NEC SilentWriter LC890, which uses a laggardly 10MHz 68000 controller but has a 10-ppm engine.

The PS 820 turbo's 2MB of memory is expandable to 8MB—enough to hold hundreds of downloadable fonts. (QMS charges \$595 for a 1MB expansion kit, \$995 for 2MB, and \$1495 for 4MB.) Like other upper-class PostScript printers, the PS 820 turbo has a SCSI port that accepts a hard disk for storing fonts and boosting performance. As for built-in fonts, the printer includes 39—the standard 35 typefaces built into LaserWriters and most other PostScript printers, plus the Helvetica Condensed family.

Like other PostScript printers, the PS 820 turbo offers emulation modes that let the printer act like something it isn't. Both the LaserWriter IINTX and

MARK JOHAN

Dataproducts' LZR-1260 can emulate a Diablo 630 daisy wheel printer or a Hewlett-Packard LaserJet Plus. The PS 820 turbo can imitate a LaserJet Plus, but it trades the Diablo 630 emulation mode for a more useful one: Hewlett-Packard Graphics Language (HPGL), a set of printing rules popular in the world of pen plotters and computer-aided design (CAD).

Little Things that Count

Price and performance are reason enough to buy the PS 820 turbo. Happily, there's more—an excellent support package of documentation and utilities for the Mac and the IBM PC. The documentation contains a useful tutorial on typographic basics as well as detailed information on the Turbo's version of PostScript.

The utilities include a program that lets you align the printer to center images on each page, and a desk accessory that lets you switch between the first and second paper trays or specify that the printer automatically switch to the second when the first is empty. Also included are Adobe Printer Description and PostScript Printer Description files. Applications such as Aldus's PageMaker and FreeHand and

Adobe's Illustrator 88 use these files to learn about a printer's specific features. For example, when a PageMaker user chooses the PS 820 turbo in the Print dialog box, additional buttons appear for choosing between the upper and lower paper trays.

Is the PS 820 turbo the best high-performance PostScript printer for under \$10,000? It depends. If you print hundreds of pages a day, you might be better served by Dataproducts' industrial-strength LZR-1260. It's a tad slower than the PS 820 turbo and costs \$1000 more, but its heavy-duty, 12-ppm Toshiba print engine is rated for 25,000 pages per month. The PS 820 turbo's Canon TX engine is rated for only 5000 pages per month.

But the PS 820 turbo definitely beats the LaserWriter IINTX—it is faster, easier to use, and has better paper-handling and emulation features. If you are thinking of buying a LaserWriter IINTX, get a PS 820 turbo instead. And if you don't need two paper trays, consider the QMS-PS 810 turbo for \$5995. It contains the same fast controller as the PS 820 turbo, but uses the single-tray Canon CX engine. —Jim Heid

See Where to Buy or circle 823 on reader service card.

Online Information Service

AMERICA ONLINE

Pros: Outstanding interface; simple to navigate; upbeat, helpful atmosphere; well-implemented services. **Cons:** Addictive; some forums not fully developed.

Company: Quantum Information

Services: Requires: Mac Plus, modem.

List price: \$5.95 per month (includes one-hour connect time; additional time billed at \$5 to \$10 per hour).

O America Online is a happy place. And, more than any other online service it is indeed a place; there are "rooms" to explore—each with its own atmosphere—and people to meet. An evolution of AppleLink Personal Edition, America Online is run by Quantum Computer Services (not the hard drive company).

Smiling Interface

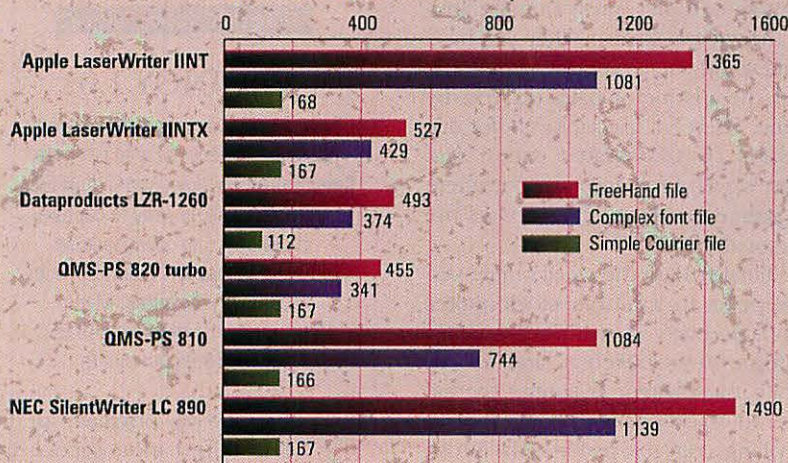
The America Online software itself guides you through the registration process. When your modem reaches the service, a cheery (digitized) voice bids you "Welcome." (This same voice later tells you, "You have mail" and, after downloading a file, says "File done.") Once you begin to use the service, you'll notice that you're in a true Macintosh environment. The commands are in menus, you can save anything on the screen in its own text file, each department is in its own window, and files are neatly organized in folders. In fact, America Online is truer to the letter and spirit of the Macintosh interface than any other online service.

Within the first ten minutes, you'll notice something else unusual: you're not interacting with some remote computer; you're actually encountering people. In the interactive areas of America Online, you see a transcript of all the remarks being written by the members currently online. Anything you type appears on the screen of anyone else in the room and vice versa, like a computerized conference call (see "Talk Is Cheap").

Real-time conferencing has been available for years—although much more expensively—on CompuServe. (continues)

TESTING THE TURBO

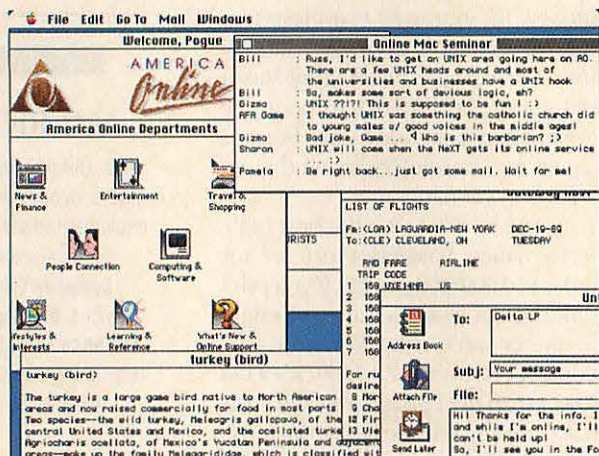
Measured in seconds taken to complete test



With complex documents, the QMS-PS 820 turbo is faster than the LaserWriter IINTX and Dataproducts LZR-1260. With simple documents, however, the turbo's 8-pages-per-minute engine is a performance bottleneck. Tests were performed on a 2MB Mac II with MultiFinder and background printing disabled, using version 5.2 of the LaserWriter driver.

Talk Is Cheap

America Online lets you work in many places at once. Here are (clockwise from top left) the opening screen; a real-time seminar; a flight reservation being made; E-mail in progress; an online encyclopedia entry; and the Departments screen, for accessing services.



But America Online takes the principle much further; real-time interaction is the foundation of its instructional, social, and Macintosh-support aspects. For example, if you get lost and need help, you don't have to leave an electronic message in some technician's mailbox. You simply enter one of the interactive rooms and find a guide—a live person, whose screen name and geographical location you know, who joins the conversation, greets you by name when you sign on, and helps you immediately with your questions.

There's no end to the fun you can have in real time. You begin to recognize people from previous visits; friendships actually develop; and, in this faceless medium, you begin to learn things about the way people communicate that aren't always apparent in real life. Many of America Online's real-time events are more structured than those on other services (for example, there are game shows, well-run computer seminars, and even online homework help for students), but simply participating in a conversation among, say, 20 people all over the country is an affecting learning process in itself.

At Your Service

There's more to America Online than its conferencing, of course. As on other online services, you can research and make plane reservations (but America Online lets you do so at no extra cost). The clean, folder-based interface for the bulletin board areas is a breath of fresh air compared with the mystifying systems used by other online services. A 32,000-entry encyclopedia produces search results in four seconds.

And a top-notch E-mail system makes messaging easy; you can compose the mail offline, send files, forward copies of incoming mail to other people, send carbon copies, and so on.

There's a fairly respectable Macintosh software library for downloading (at this writing, about 6000 files). It's only a fraction of the size of the more established libraries, like the one on CompuServe, but it grows daily. There's also an online shopping service run by CompuStore Online. The store's discounted prices are guaranteed to be lower than street prices (and because it's a form of mail order, you usually don't have to pay sales tax).

There is a heavy philosophical emphasis on learning and on social interaction. For example, real-time instructional classes are offered on a number of topics (programming, music theory, and so on). When you have a question, you type a question mark, and the instructor calls on you by name. There's a special forum for discussion of AIDS-related issues. And there's even a romance section, where an online matchmaker supervises the personal ads.

Finally, all of the usual online-service perks are available: stock quotes (updated every 15 minutes), weather reports, news bulletins, and so on. While the content is similar to that offered on other services, the form—scrolling, copyable text in a Macintosh window—is infinitely more palatable.

If at any point in your explorations you need help, you can enter a special help forum; you're not billed for the time you spend in this area. That's consistent with the rest of the service's helpful, upbeat atmosphere.

Online on the Line

Because it's a fledgling operation, there are still a few problems with America Online. For example, there's not yet very *much* of anything—the system could be improved with more services, more forums, and a larger membership. You can't do banking with the service, and you can't order groceries. You might even complain that the service occasionally carries the Macintosh interface too far; for example, to read a joke in the humor section, you have to plow through six nested folders. And sometimes in the evening, glitches in the phone-switching system cut you off in midsentence.

But as long as you understand America Online's emphasis on telecommunications, you won't be disappointed. The heart of America Online is "live" interaction between people—instructors, system administrators, and other Macintosh and Apple II users. And America Online's exemplary interface is so friendly that it's easy to forgive the fact that its services and membership are still expanding. It's not the right service for business users, doctoral thesis researchers, or grouches. But it's great for anyone else who gets a kick out of the Macintosh. America Online, you might say, is the service for the rest of us. —David Pogue

See Where to Buy or circle 702 on reader service card.

Online Information Service

PRODIGY 1.0

Pros: Attractive pricing; wide variety of useful services; easy to navigate.

Cons: Extremely slow; horrendous IBM-style interface; no way to capture information; no downloadable software. **Company:** Prodigy Services Company. **Requires:** Mac Plus, modem. **List price:** \$49.95; service \$9.95 per month.



Prodigy was originally an online information service for IBM computers. A joint effort by IBM and Sears, it offered an innovative navigational scheme, colorful graphics, and some dramatic steps into the future of home computing. With only a modem and the Prodigy software (continues)



Mitch Kapor, chairman, ON Technology.

"Before you can ask, 'Where's my file?' you'll be reading it."

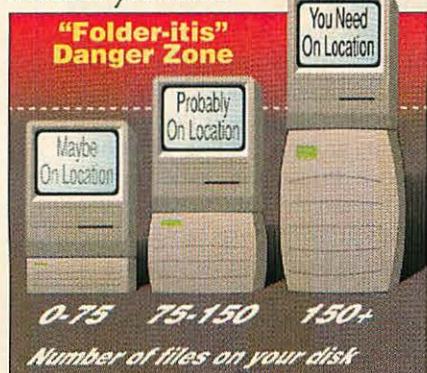
"It happens all the time:

You sit down, ready to work. Then, because you have hundreds of files on your hard disk, you waste time looking for the file you want. If you find it, you have to run a word processor to see what's inside.

That's crazy. And that's exactly why we created the On Location™ desk accessory: to make finding and viewing files as fast and simple as possible.

The fastest way to find and view files

You don't have to remember file names to use On Location. Just type in a word or two from the file you're looking for. So if you need the letter you wrote to John Simmons about the insurance policy, type 'Simmons' and 'insurance.' Within seconds, On Location scans its index of all the text on your hard disk and finds your letter.



And you don't have to open your word processor to read the file. Double-click on the file name, and you'll instantly see the text, including the original fonts and styles for word-processing documents. You can also copy text to the clipboard. Or launch the file directly into its application program.

If you do remember a file name (or part of one), you can type that in the search window. On Location starts looking as you type, and often finds the file before you finish.

The story behind the speed

On Location is so fast because it stores an extremely compact index of your hard disk. (This index usually takes up less than two percent of the disk.) As you save and move files, On Location automatically makes note of the changes. Then, when your Mac is idle, On Location indexes the name and text of these files.

We call that steady, silent process 'background indexing,' and On Location is the only Mac product to provide it. Background indexing means that On Location is always up-to-date and ready to work when you are.

It took us months to fine-tune On Location. But it's only going to take you a few minutes to appreciate On Location's power—and to learn how to use it.

On Location offers unmatched speed and convenience

- find a file by typing its name or words it contains
- search an entire hard disk in seconds
- view and copy text from files, without opening applications
- see actual fonts and styles for leading word processors, including MacWrite II, Microsoft® Word, WriteNow,™ and WordPerfect®
- directly open files and application programs
- move, copy, rename, and delete files
- find text in most files, including HyperCard®, PageMaker®, and Microsoft® Excel
- search for all forms of a word ("fuzzy matching")

Requires Macintosh® Plus or above, with a hard disk and System 6.0 or above.

One-year guarantee

We're proud of On Location. All products should work this way. And all products should come with this guarantee: if you're unhappy with On Location for any reason during the first year you own it, you may return it for a full refund.

Try On Location. You have nothing to lose—and a lot to find."

ON
Technology

One Cambridge Center
Cambridge, Massachusetts 02142
(617) 225-2545

ware, you could do your banking, book airline reservations, and even order groceries.

The service has now been adapted—in a manner of speaking—for the Macintosh. Prodigy's introductory offers are generous and its pricing scheme is favorable to frequent users. Instead of paying a steep hourly rate (as for CompuServe), you're billed a flat \$9.95 per month, no matter how much you use the system.

Where's the Mac?

Unfortunately, the makers of Prodigy haven't gone nearly far enough in adapting Prodigy to the Macintosh, either technically or philosophically. There are no windows, no menus, no Macintosh fonts. Instead, your screen is painted, top to bottom, with gawky-looking IBM lettering (see "Prodigy's Face"). There is some attractive use of color for Mac II users, but the scheme otherwise offers nothing but penalties. That is, because Prodigy sends an entire screenful of graphics information at a time (and not textual information, like most online services), you have to wait until the service has transmitted the entire screenful before a new screen can appear. Even on a Mac IICI with the color turned off, the wait for each new screen is intolerable—between 6 and 15 seconds per screen at 2400 baud. More than anything else, Prodigy is slow.

The all-graphics scheme is also much more sensitive to transmission errors than text-based systems are. The slightest bit of phone-line static is likely to require the time-consuming retransmission of the entire picture or, at worst, will cause you to be unceremoniously logged off the system, leaving you no choice but to log on again and hope the phone lines are kinder.

Prodigy doesn't support MultiFind or desk accessories, either. That's a serious problem if you encounter something on the service that you want to retain; there's simply no way to capture text from Prodigy onto your disk. You can capture a bitmapped image using the ⌘ -Shift-3 function key, which gives you a MacPaint file you can open later, or you can send a particular screen's text to your printer. But the former solution is inconvenient, and the latter results in a waste

of paper and printer time. Because Prodigy uses a crude 24-point typeface, only a few lines fit on a screen, so no printout ever contains more than a paragraph or so. This inability to conveniently capture information is unforgivable. It immediately robs the service of much of its usefulness.

Ad Out

One other little detail of Prodigy's interface may annoy you: teasers for advertisements appear on the bottom fifth of the screen at all times. They run from the typical ("Enter the Air France sweepstakes") to the unappetizing ("Imodium A-D can stop diarrhea with just one dose!"). Should these teasers prove enticing, you can choose to see the entire ad.

As if the teasers weren't offensive enough, Prodigy's computers monitor the time you spend looking at the ads whenever the teasers pull you in. And all of the data regarding your reaction to the ads, as well as your demographic characteristics, is then passed on to the advertisers. The whole system is a little disconcerting.

Jumping for Joy

If you can overlook all of these drawbacks, the service itself is very good. You never feel bewildered, as you often do using CompuServe. Each Prodigy service has been assigned a keyword. Type one of these *jump words* and press Enter, and you move directly to that service. MHT Bank is Manufacturers Hanover electronic banking, Siskel takes you to Gene Siskel's latest movie review, Browns shows you the

latest Cleveland Browns football scores, and so on. To make navigation even easier, the jump word **Index** always takes you to an alphabetical list of Prodigy's hundreds of services. You can move immediately to any service by double-clicking on its name, so exploring is easy and inviting.

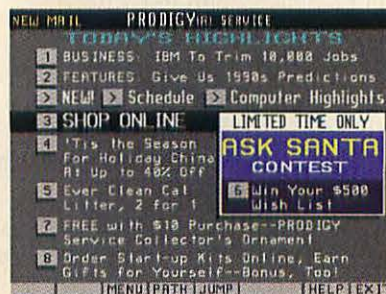
At Your Service

The services themselves vary widely in quality and usefulness. The extra-cost banking is practical—the bank will write and mail checks for you. The news, weather, stock quotes, and sports scores are all up-to-date and easy to find. There are complete reprints of *Consumer Reports* articles and tests. Eaasy SABRE, the airline flights-and-reservations system (run by American Airlines) is a bit confusing, but on Prodigy it is free (the equivalent program on CompuServe carries a steep hourly fee).

Prodigy also has bulletin boards about Macintosh hardware and software, but the problem is that only a few lines of gigantic text appear on a screen. You have to click the Next button to see the rest of the message. When compounded by the system's devastating slowness, you can see how clumsy the process is. The same problem plagues the electronic-mail system. And not only is there no real-time conferencing on Prodigy, but every message you post on a bulletin board is screened for content by Prodigy's "editors"; therefore, no message appears online until the day after you send it. For example, you're not permitted to post any message that smacks of "commercial, classified, or personal" advertising. I volunteered to help a bulletin-board member with a Mac problem and sent him my phone number. But the exchange of phone numbers or addresses is prohibited, so my message was returned to me with the explanation that it "failed to meet the [Prodigy] guidelines."

Incidentally, if you decide to try ordering groceries online, don't order produce. In fact, don't order anything you'd normally want to select yourself. My grapefruit was moldy, the cucumber looked more like a pickle, and the lettuce seemed to have been sat upon (not Prodigy's fault, of course).

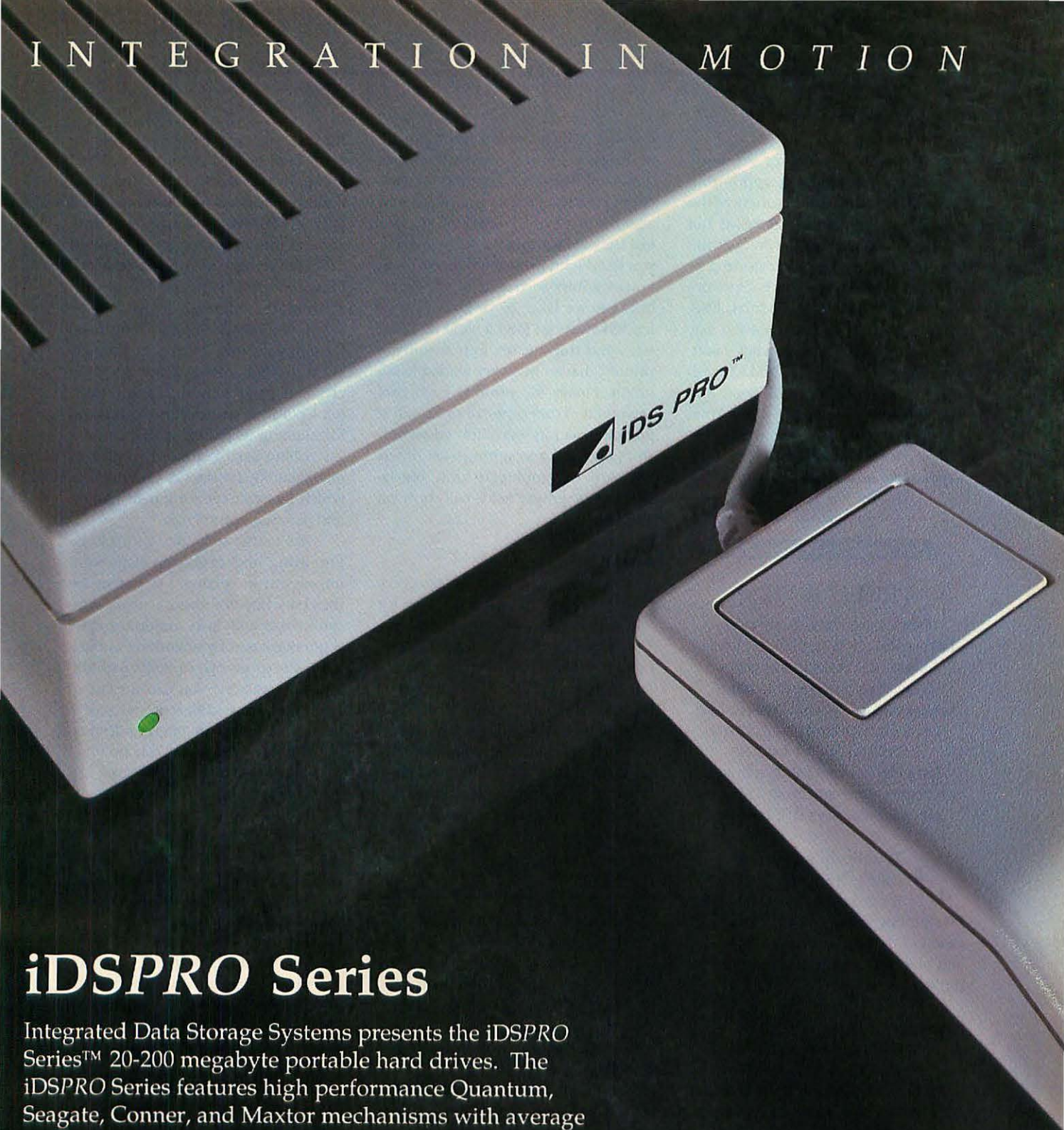
(continues)



Prodigy's Face

Prodigy's opening screen is typical of its interface: large, crude typefaces; no menus; and a number of buttons that you double-click. This opening screen doesn't show the usual advertising stripe at the bottom—but you get the idea, since most of the options are commercial in nature.

INTEGRATION IN MOTION



iDSPRO Series

Integrated Data Storage Systems presents the iDSPRO Series™ 20-200 megabyte portable hard drives. The iDSPRO Series features high performance Quantum, Seagate, Conner, and Maxtor mechanisms with average access time ranging from 12-35 milliseconds. It comes in a transportable package of 2x5x8 inches, and weighs less than 3 pounds.

This is the ultimate in portable, modular, unit expandable storage subsystems.

To find an iDS Systems' Authorized Dealer Near You,
CALL 1-800-733-0078.



iDS SYSTEMS, INC.
INTEGRATED DATA STORAGE SYSTEMS, INC.

Circle 192 on reader service card
2, 3 & 5 Year Warranties!

Koll Bayshore Bldg. 2107 N. First Street
Suite 280 San Jose, CA95131

Prodigal Someday

The prodigious failings of Prodigy's interface are doubly disappointing because the quantity and variety of the services themselves are impressive. But Prodigy's idea that it can win over the Macintosh world simply by porting its problem-plagued interface is a misconception. Without fonts, menus, DAs, windows, MultiFinder, or a good way to capture text to disk, Prodigy's software can hardly be called a Macintosh application. And until its speed and interface problems are overcome, Prodigy can hardly be called a Macintosh service.—David Pogue

See Where to Buy for contact information.



Electronic Forms Management

TRUEFORM 2.0

Pros: Easy-to-understand manual; fast operation; enhanced Fill-Out module.

Cons: Lacks drawing tools; print-alignment dialog box not interactive.

Company: Adobe Systems. **Requires:** Mac Plus; additional memory, hard disk, and scanner highly recommended.

List price: TrueForm Set-Up with one copy of TrueForm Fill-Out \$395; four additional copies of Fill-Out \$295.



TrueForm's original publisher, Spectrum Digital Systems, was acquired by Adobe in October 1988; and version 2.0's cleaner interface, relative lack of bugs, and first-class manual definitely show the Adobe stamp.

Formalities

Any forms-design package must consider how its users will divide up creating forms and filling them out, and whether to emphasize data management or graphic design. A program like TrueForm, designed primarily for turning scanned copies of old paper forms into electronic forms, also runs up against TIFF files' slow print times, laser printers that can print only 8-by-10 1/2-inch documents in a world full of 8 7/16-by-10 7/8-inch paper forms, and multipart forms with different data on each layer.

There are no easy answers to these problems, but TrueForm has a way around some of them. Its *forms-*

caching (which stores a form's image in the laser printer's memory and redraws only the fields' contents for each copy) greatly increases printing speed after the first copy. TrueForm can print just the data without the form image if you hand-feed preprinted forms to an impact printer such as an ImageWriter, but until we have 25- or 50-bin paper feeders that can feed a wide range of sizes and thicknesses into an impact printer, that's not a very workable solution. Finally, by printing each part separately, TrueForm can print differing information—say, for customer, shipping, and accounting—on different parts of a multipart form, but labels for the empty fields will show on all parts.

A Formal Application

TrueForm is actually two applications: one for setting up forms, and one for filling them out. To use TrueForm Set-Up you import either a scanned form or a PICT file—TrueForm has no drawing tools at all. When you click on a line or box in the imported form, TrueForm locates the edges of the object and places a data entry field over it. You can format fields for text, numbers, dates, and check boxes; and you can assign them spreadsheetlike formulas to perform operations such as calculating totals on an invoice, adding 30 days to a date, or evaluating a text string to pick out Texas addresses and then add sales tax. When you have finished setting up a form, you can open it in Fill-Out, tab through the fields, enter data, and print completed forms or save them in Stacks (no relation to HyperCard).

Reformed

Version 2.0 has some new features and a lot of improvements. The old manual's tutorial has disappeared for some reason, but the new manual explains TrueForm more clearly, in particular

how to use the functions (including eight new ones) to build constraints and perform calculations. Overall operation is faster and smoother. On a Mac II, TrueForm Set-Up 1.0 took about 5 minutes to import a scanned TIFF file; version 2.0 running on a Mac Plus imported the same file in only 1 1/2 minutes. Impressive.

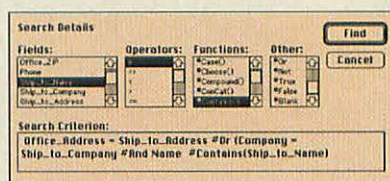
If you're scanning a multipage form directly into TrueForm, the new version lets you rescan a single crooked page without starting over. Set-Up also now includes a command for aligning fields; fields that present a scrolling list of choices (similar to FileMaker's); a wider tab-order dialog, which lets you see long field names; and password protection.

The merge-sequence controls for importing and exporting data were impressive in version 1.0, but in 2.0 they have become almost surreal. You can create and save multiple merge sequences, and by delimiting individual fields or groups of fields with different characters, you can import to or export from different parts of a form, and to or from different destinations and sources. You can now append exported text to an existing file. You can also apply constraint-checking to data as it is imported, and skip the headers in an imported file.

You can set up numbers with incredibly detailed formatting so that, for example, TrueForm displays parentheses around negative numbers, places a dollar sign before an amount, and rounds the pennies to two decimal places. Date and number formats are also user definable, as in Excel. Finally, for 4th Dimension users, a special 4D module that comes with TrueForm will add a new menu to your 4D applications to export data from 4D into TrueForm for printing.

Deformed

Set-Up still can't zoom in on small areas like check boxes, nor can it juggle rectangular fields placed over irregularly shaped areas (such as individual facets of teeth in TrueForm's sample dentist's chart). Zooming in on a scan, which is stored at 300 dots per inch but displayed at the Mac monitor's 72 dpi, is always a problem, but Adobe Illustrator manages it elegantly. Even *(continues)*

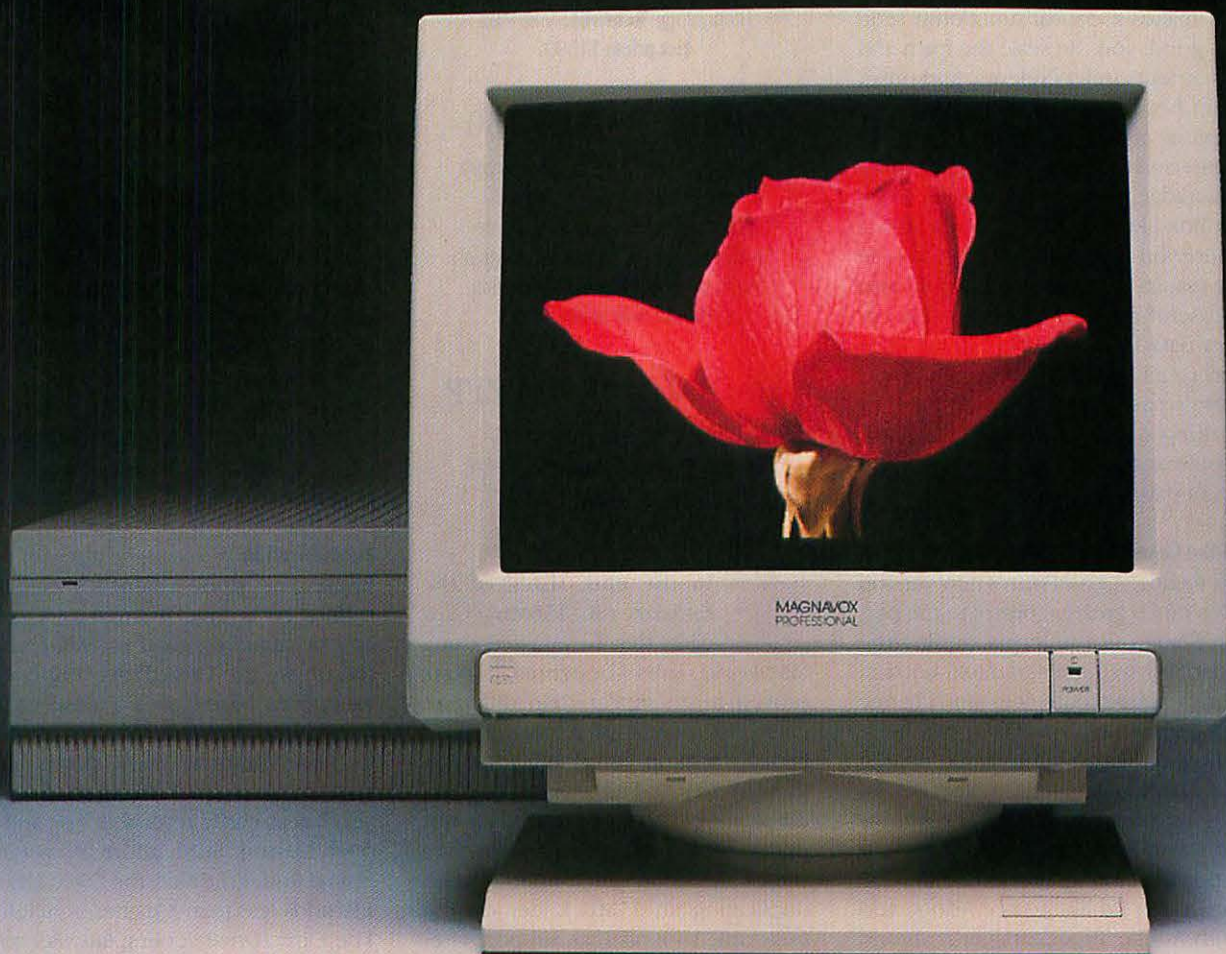


Search Menu

TrueForm Fill-Out's Select dialog box provides the power to root out forms buried deep in a Stack.

Introducing A Better Display For The Macintosh II® ...

For About \$300.00 Less Than You'd Expect.



This is not just another display clone. It's the new Magnavox Analog Color (MAC) display, specifically designed and engineered to compliment the Macintosh II system.

When we decided to develop a display exclusively for the Macintosh II, we started with two objectives: Make it work better, and make it cost less.

Our 14" MAC display appeals to even the most discriminating user. It's equipped with our new proprietary 0.29mm dot pitch

CRT for superb resolution, and a glossy CRT face for crystal clear images. Graphics and text on the MAC display shine at their best. The integrated tilt-base provides the ultimate in user comfort.

Additionally we offer a solid, two-year warranty instead of the usual 90 days. And the \$699 retail makes this a great value.

Designing a superior display for the Macintosh II system was smart. Offering it for \$300 less, that's very smart.

MAGNAVOX
Smart. Very smart.

more useful than zooming would be different field shapes (circles would be especially useful) or the autotrace capability found in Adobe Streamline. TrueForm still lacks even rudimentary drawing tools—the one I miss most is an eraser or white box for covering up junk (scanner detritus, for example). The modal printing-alignment dialog box makes a critical function a tedious grind: you can scale the form and its contents independently and offset them horizontally and vertically, but effecting a change on the form requires closing the dialog box each time you nudge the image. I'd prefer a dialog box like Microsoft Word's Styles, where you can apply a change and see the results immediately. It would also be useful if the same hooks that export data from 4D could drop TrueForm data back into 4D. Finally, TrueForm's password protection is all or nothing—you can't give different people access to or control over different parts of a form.

Fill-Out Changes

Interestingly, TrueForm's new version gives much greater control to the person filling out the forms, adding the capability to define default entries, modify merge sequences, and change text formatting. TrueForm has been enhanced with sophisticated search and select capabilities, a label set-up option in the Print dialog box, and—for those overnight print jobs—an option to collate multipage forms. One nice touch I'd like to see Adobe add (with Adobe Type Manager it should be easy) is the ability to rotate the horizontal QuickForm fields (TrueForm's version of comments scrawled on a paper form) so they would be more visible.

The Future of Forms

So far, no forms program can entirely replace paper and pencil. On the other hand, the appeal of not having to do double work—first on a paper form, then at a keyboard entering the data into an accounting program—will continue to push electronic forms until the reality catches up with the concept. In the meantime, TrueForm is a practical and even attractive interim solution. —Dan Littman

See Where to Buy or circle 848 on reader service card.

★ Midsize Hard Disks

DATAFRAME XP100

Pros: Excellent backup, utility, and print spooler software included.
Cons: Upright configuration takes up desk space. **Company:** SuperMac Technology. **Requires:** Mac Plus.
List price: \$1599.

DIRECTDRIVE 130

Pros: Includes SUM II disk-recovery and utility software, two AC power outlets. **Cons:** Inadequate technical support. **Company:** Jasmine Technologies. **Requires:** Mac Plus; SCSI port. **List price:** \$1349.

MACINSTOR 100-ZFP

Pros: Good utility software.
Cons: Noisy fan. **Company:** Storage Dimensions. **Requires:** Mac Plus. **List price:** \$1899.



In the end, three of the midsize (80–150MB) hard disks that I evaluated using Macworld Labs' benchmark tests proved more similar than different. Each disk comes preformatted, and includes backup, partitioning, and utility software. And although the speed difference between the three units was minor in normal use (the Jasmine lagged by almost half a minute when duplicating an 11MB folder on the desktop), I found that support after purchase was the determining factor in deciding which drive to buy.

DataFrame XP100

The internally terminated DataFrame XP100 stands upright and uses a drive mechanism manufactured by Quantum. Noise from the cooling fan, although noticeable in a quiet room, was not intrusive. The XP100 comes with an excellent set of utilities. The DiskFit backup program backs up to floppies or another hard disk volume. Two print spoolers are included: SuperSpool, for direct connection to ImageWriters; and SuperLaserSpool, for connecting to AppleTalk ImageWriters and LaserWriters. All three of these utilities are special versions that



Three midsize hard disks

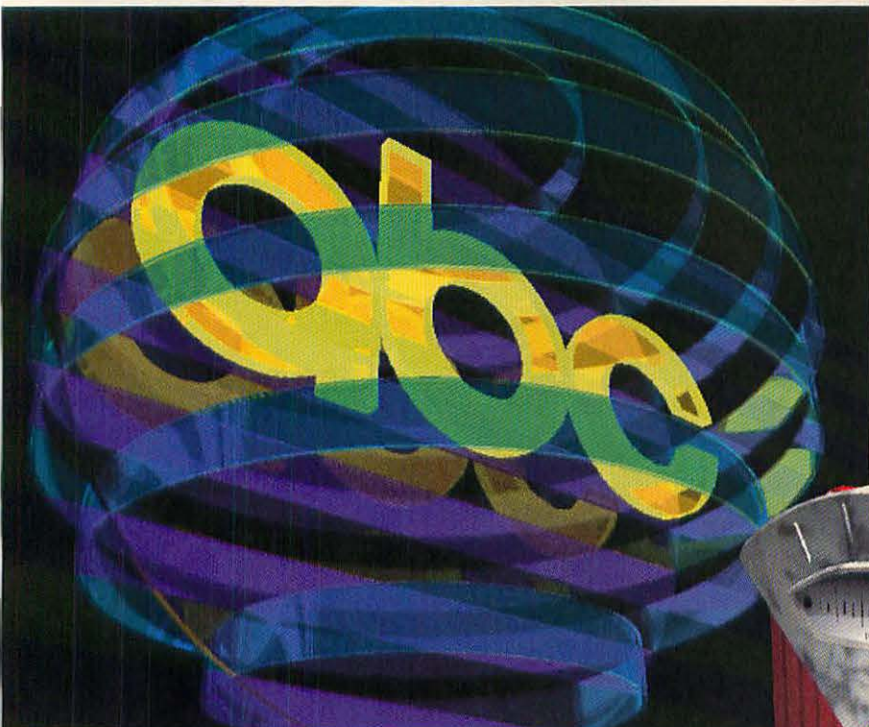
work only with DataFrames. Also included is the Manager utility, consisting of an application and a cdev. The Manager application lets you test the drive, change the SCSI ID, or partition the disk. The Manager cdev allows you to mount hard disk partitions, which can then be password-protected and encrypted. The XP100 feels quick in operation, as did the other two tested units.

DirectDrive 130

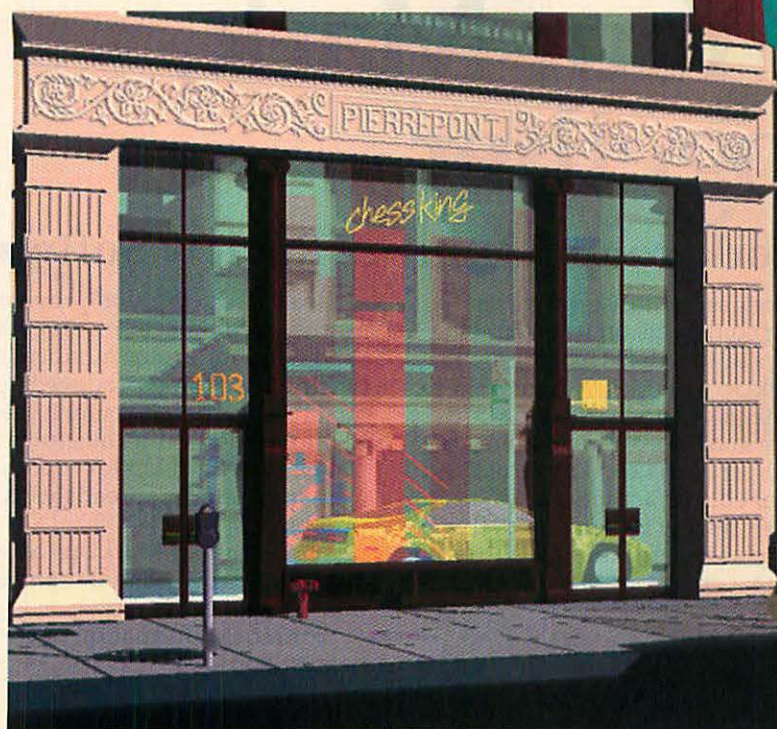
Jasmine has made a name for itself by making good drives in smart packages, and by bundling great software with the units. The DirectDrive 130 is no exception. Based on a Fujitsu drive mechanism, the unit has several nice features. There are two AC power outlets on the back of the hard disk; it also has an easily accessible fuse and a push-button SCSI address switch. Placed under the Mac, the DirectDrive 130 adds less than 3 inches in height. The DirectDrive cooling fan was quieter than the DataFrame's. One oddity was that the drive periodically makes a clattering—unlike normal drive access noise—for about two seconds. This wasn't especially annoying and didn't appear to cause any problems. The DirectDrive 130 rated a little slower than the other two units on the SCSI Evaluator and large-folder duplication benchmarks, but held its own when opening Excel and PageMaker files.

Jasmine includes DriveWare, an application and cdev combination, which is comparable to SuperMac's Manager in terms of functions and ease-of-use. DriveWare includes online help for the inexperienced. Jasmine (continues)

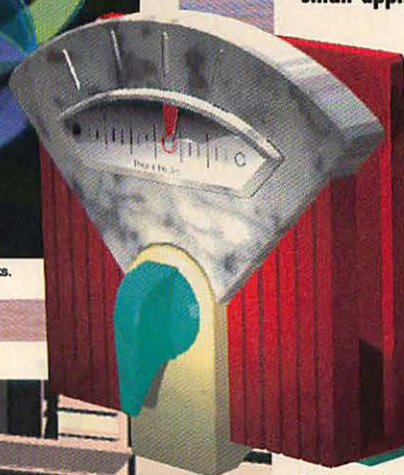
STRATAVISION 3d. SOPHISTICATED GRAPHICS AS SIMPLE AS ABC.



Client: ABC Entertainment/Mark Zakarin. *Producer: Marks Communications Inc. Creative Director: Harry Marks. Designer: Dale Herigstad.



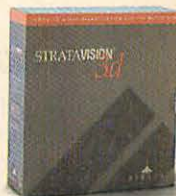
Producer: KCA Architects. Designer: Colin Cathcart. Client: Chess King.



Producer: Design Edge. Creative Director: Chipp Walters. Designer: Mark Kimbrough.

Ever since we introduced STRATAVISION 3d, designers, illustrators and architects have been transforming their ideas into great images. Now you can do the same. You'll find STRATAVISION 3d's modeling, scene composition and rendering as simple as point-and-click. Yet our image quality is what you'd expect from expensive graphic workstations. Produce detailed pictures of objects and scenes with shadows, textures, reflections, and with a photo-realistic quality you thought wasn't possible on the Mac. Whether you're rendering a small appliance or a large aircraft; creating artwork for a newscast or a newsletter; designing a new building or revitalizing an old one, STRATAVISION 3d puts your work in the best possible light. All in full color. All fully three dimensional. All with the ease and simplicity of Macintosh. Call our

toll-free number now. Let us show you how easy it is to turn your ideas into great images.



STRATA

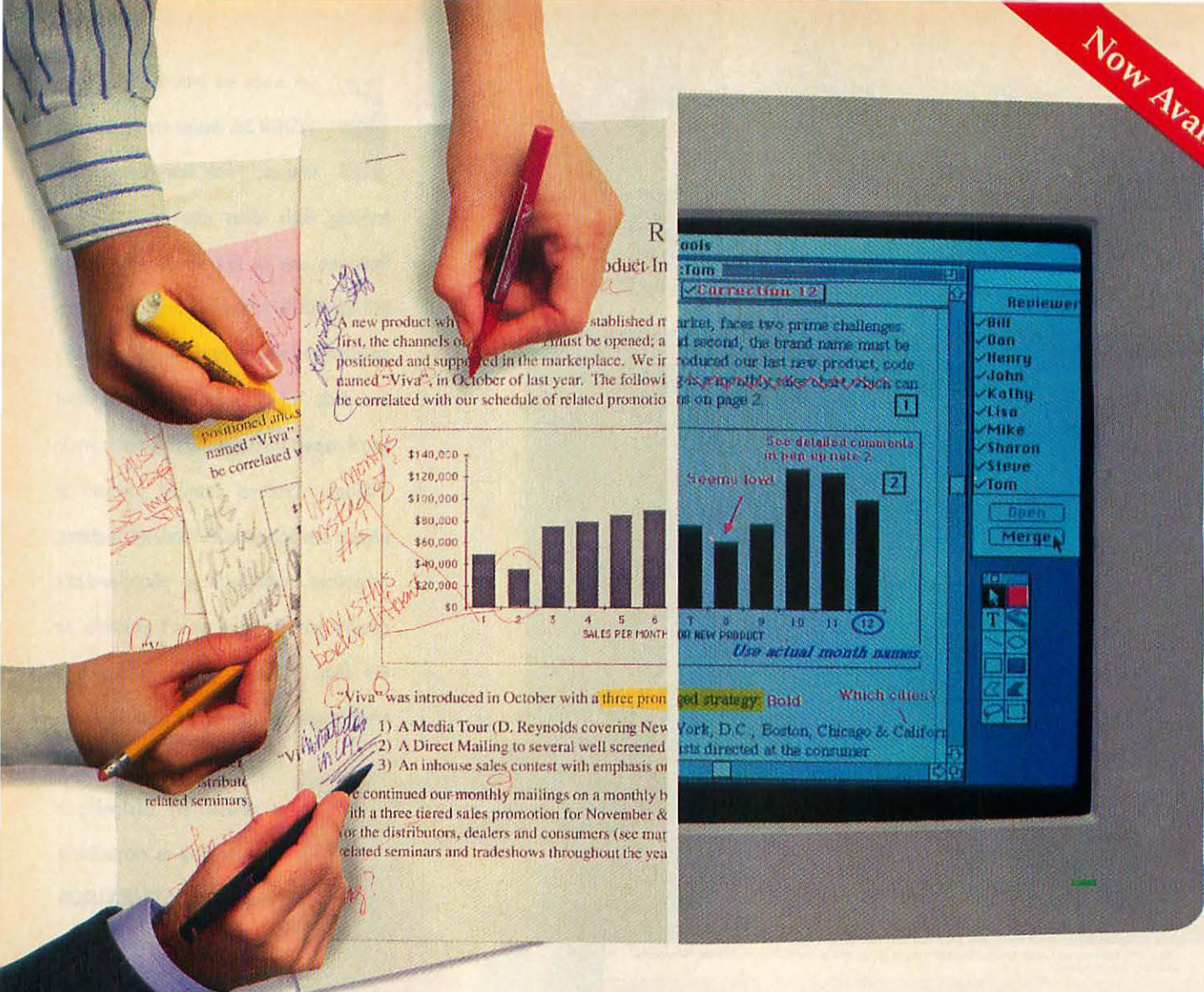
1-800-869-6855 ext. 200

See Us At MACWORLD EXPO
Booth #49, Moscone Center

*The ABC image, produced by Marks Communications Inc., used STRATAVISION 3d to preview and storyboard concept, and was not used as final broadcast animation. Macintosh is a registered trademark of Apple Computer, Inc. Strata and STRATAVISION 3d are trademarks of Strata, Inc. 340 E. Tabernacle, Suite 201, St. George, Utah 84770.

Circle 504 on reader service card

Now Available



Make Your Mark, Together

Introducing MarkUp™, Workgroup Editing & Review Software

It's ironic that documents created with hi-tech efficiency revert to archaic methods for review: lots of paper, red pencils, scribbles, mail delays and wasted time. Now there's real improvement for group editing, review and approval — MarkUp.

Here's how it works: print an image of a Macintosh document to disk from any application with MarkUp Document Creator. Publish it electronically to a workgroup for review.

Group members don't even need the creating application, just MarkUp. Reviewers work simultaneously — on

a network or by transferring files — making comments on transparent overlays of the MarkUp document.

MarkUp provides tools to rewrite, annotate, highlight, strike out, correct, manage and approve documents of all types. It even keeps a journal and status of editing activity.

When review is completed, use MarkUp's powerful merge feature to combine a group's comments and print the annotated document as a basis to rework the original. Better yet, open the original document next to the MarkUp document with Multi-Finder and copy changes directly.

Real productivity improvement means working better — together! Whether your group numbers two or twenty-two, you'll produce higher quality documents in much less time. Reduce paper traffic, meetings and travel. Use MarkUp for reports, drawings, letters, spreadsheets and proposals.

Inquire about MarkUp today. Take a step toward making your mark, together.

For more information or the dealer nearest you, call:

Mainstay

5311-B Derry Avenue
Agoura Hills, CA 91301
(818) 991-6540

71 rue des Atrebatés
B-1040, Brussels, Belgium
322/733.97.91

Please circle 7 on reader service card.

ships the hard disk with a folder called DemoWare, which is a good assortment of about 6MB of public domain, shareware, and demonstration versions of commercial programs. The DirectDrive 130 also comes with Symantec's SUM II disk-utility package, which includes backup, encryption, and optimization programs, as well as one of the best crashed-disk-recovery programs available.

MacinStor 100-ZFP

The MacinStor 100-ZFP is built around the same Quantum 100MB mechanism as the DataFrame XP100, so it wasn't surprising that the two units produced virtually identical test results. The MacinStor has external SCSI termination, so you'll have to use the supplied terminator if you put the hard disk at the end of the SCSI chain. You change the SCSI ID with a rotary switch on the back of the unit. The cooling fan was annoyingly loud in a quiet room.

MacinStor's Installer program, which includes an application and a cdev, shares many of the same features as the installers that come with the other two hard disks. Storage Dimensions bundles Central Point Software's PC Tools Deluxe Mac Version with the 100-ZFP. This software includes a Locate DA, recovery applications for crashed floppies and hard disks, a file defragmenter, a backup program, and several other well-thought-out and useful utilities. Although PC Tools Deluxe has many of

the same functions as the SUM II package, the Symantec utilities come with a superior manual and are better integrated to work together.

Support Systems

It doesn't matter how good the hardware is if you can't get help from the hard disk's manufacturer when something goes wrong. I placed two anonymous calls to each manufacturer's technical support line over a period of a week. I asked questions about both the hardware and the bundled software. I graded the response according to accuracy, promptness, and courtesy. (None of the manufacturers offer a toll-free number for technical support.)

SuperMac's support staff fared best of the three companies. I was put through to a support technician after a wait of no more than a few minutes. Both people I spoke with there were knowledgeable about the product, were pleasant, and easily fielded my questions. I rated SuperMac's support as very good.

Storage Dimensions put me on hold for a few minutes, then an operator offered to have a technician call me back. I received a callback within two hours, but I managed to stump the technician with a fairly complex question. To his credit, he promised to find out the answer and call me back, which he did within a half hour. I rated Storage Dimensions' support as good.

Jasmine's support was abysmal.

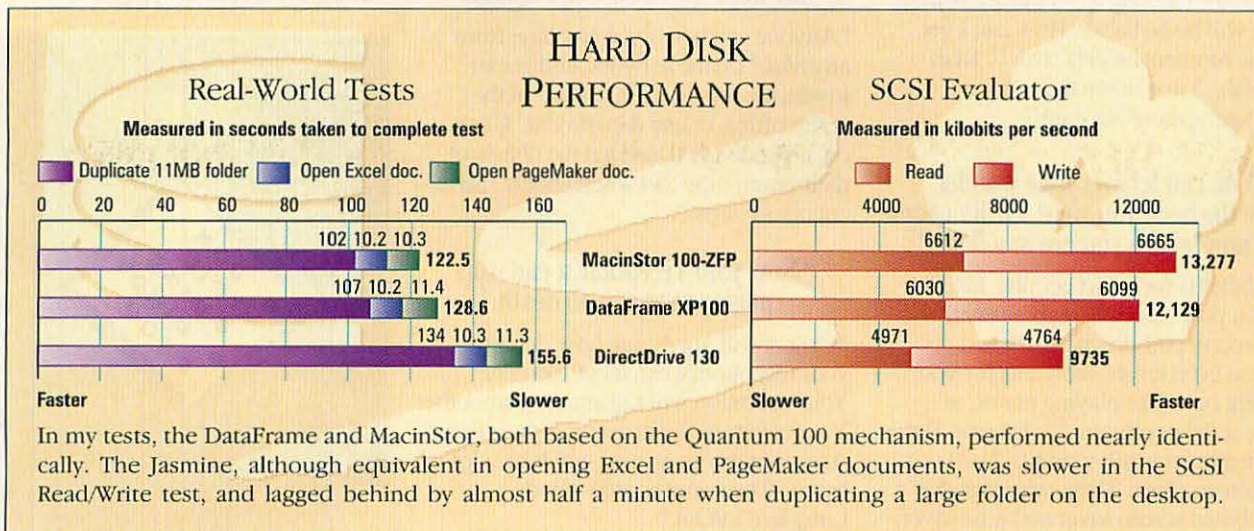
After being put on hold for more than 20 minutes without a response, I called back and asked to speak to a technician immediately. I was told that they were all busy and that if I left my number, someone would call me back later that day. I never received a call. In four separate calls I never spoke to a technician. Jasmine's support rated unacceptable.

Which Hard Disk Should You Buy?

None of these hard disks will disappoint you in terms of performance. But with the market as competitive as it is these days, you have to look at the whole picture to make the best choice. The hardware, the bundled software, the product support, and the price are all important.

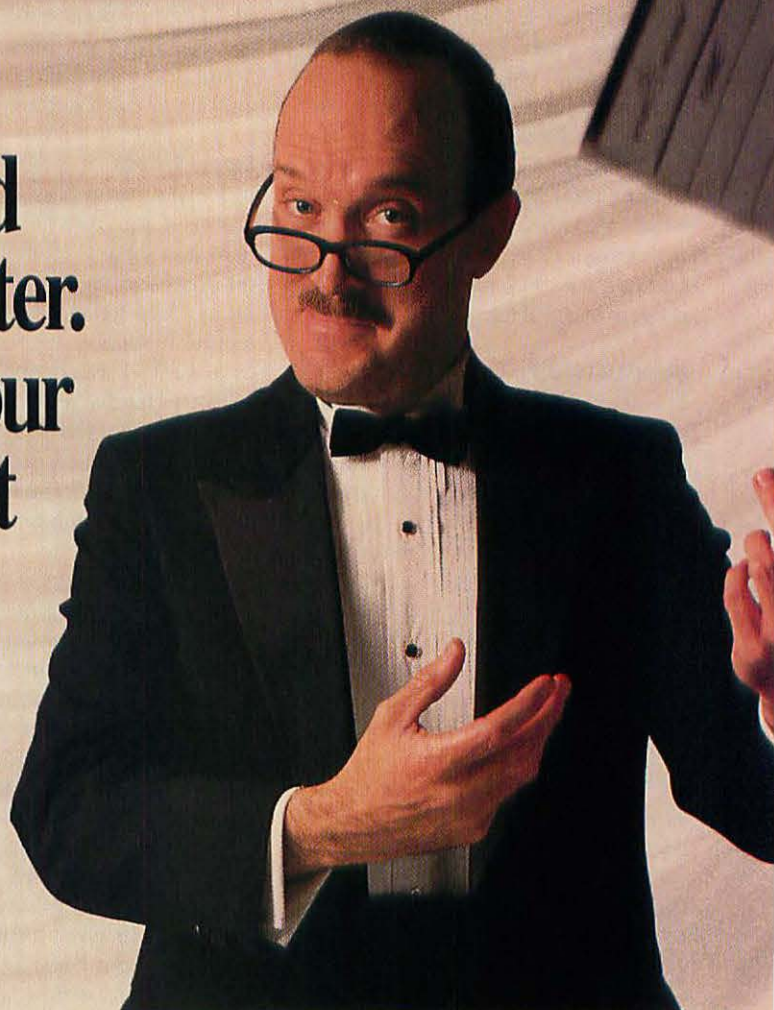
The Storage Dimensions MacinStor 100-ZFP is a fine unit, but it costs \$300 more than the SuperMac DataFrame XP100, which is based on the same Quantum mechanism. And while PC Tools is a good package, I found the SuperMac utilities easier to use. The Jasmine DirectDrive 130 gives you an extra 30MB of storage for \$250 less than the SuperMac, and has excellent bundled software, but also has unacceptable product support. Although I feel the DirectDrive 130 is the overall best value, because of Jasmine's support problems, I have to rate the SuperMac DataFrame XP100 as the winner.—Tom Negrino

See Where to Buy or circle 724 (DataFrame XP100), 727 (DirectDrive 130), 785 (MacinStor 100-ZFP II) on reader service card.



Dr. Productivity Says:

**"You trashed
your typewriter.
Now trash your
office in/out
board."**



**"Never wonder where the heck
George went again."**

"The busier your organization, the more time you waste running around looking for people. 'Where's George? Should we start the meeting? Should we wait? When will he be back? How can I get him the moment he gets back?' Blah blah blah. Time down the toilet. Fortunately, there is a cure."

**"You can let everyone wonder
where the heck you went. Or let people
know where you are in a flash."**

"The latter is for smart people. In/Out™ lets you post your whereabouts with a five-second pull-down. Click and go. You can even create short cuts for your frequent outs, like playing tennis, at lunch, at the psychiatrist, whatever. Bang. You're electronically posted. And your own screen gets a 'sleep' message that's a combined screen saver and time saver,

because it shows anyone who looks into your office where you are."

**"If you want exercise, go to a gym.
If you want to know where anyone on
the network is, click the mouse."**

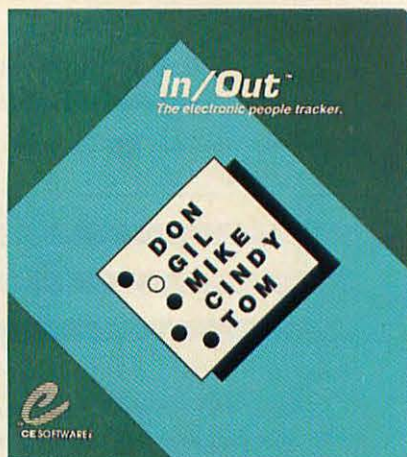
"Anyone can hot-key at any time from any Mac® on the network, and get an instant electronic In/Out board of the entire office, or any department. Click on any individual, and get the details of their return time and whereabouts. Save countless steps."

**"Now your receptionist can stop
paging everyone to death."**

"Callers will appreciate how quickly your receptionist can locate people. Your operation will run smarter, smoother. Your electronics will astonish your friends. And your reception area will look a lot better. The in/out board is dead. Long live In/Out."

**"Go to a dealer
and try it."**

For the Macintosh. Suggested retail price: 10 user pak: \$299.95
Free literature and Where To Buy:
1-800-523-7638 Dept. CE31.





Point of Sale and Inventory Management

POS-IM 2.0

Pros: A sophisticated, powerful, comprehensive program; excellent use of the Mac interface; imports and exports text files; links directly to Layered's Insight Expert Accounting series.

Cons: Some training might be needed if unfamiliar with automated point-of-sale/inventory systems; documentation lacks index; no specs for program capacity.

Company: Ensign Systems. **Requires:** Mac Plus; 20MB hard disk. **List price:** \$1795; multiuser version \$2495.



POS-IM (or Point of Sale—Inventory Management) is for businesses with large, complex inventories that require an integrated sales and inventory system. The program competes less with other Macintosh inventory applications than with similar minicomputer programs.

POS-IM makes excellent use of the Mac interface, allowing you to click from summary information to invoices to inventory items. An added advantage of the program is its linkup with Layered's Insight Expert Accounting series. POS-IM feeds its information directly into Insight's Accounts Receivable module, which in turn feeds the data into Insight's General Ledger. If you don't use the Insight system, you'll have to key the data directly into your general ledger program.

POS-IM contains three separate modules: Sales-Point, the point-of-sale program; Inventory-Analyzer, the inventory program; and Accounts-Receivable. POS-IM includes an excellent 46-page tutorial, a setup guide for the program, and a reference manual. Although the documentation is well written and you get 60 days of free telephone support, you will likely need help in training your employees with the system. I suggest picking a supplier carefully, especially if you are not presently using an automated point-of-sale/inventory system. Learning the program itself is not especially difficult, due in large part to its excellent interface. But learning any point-of-sale/inventory system is by no means a piece of cake, and you might have to depend on your supplier for help.

Taking Inventory

Setting up the POS-IM system is the starting point, and the program does all it can to help by importing text files with ease and setting up inventory item cards if your import text is in the correct format (formats are defined in the reference manual). All inventory items carry item codes, and the program gives you ample flexibility in assigning your own numbers or using those preassigned by manufacturers. The program integrates with TPS and MSI hand-held light pens, the Metrologic countertop scanner, and the Indiana and APG cash drawers. You can scan merchandise into and out of inventory using preprinted UPC bar codes, or you can create your own alpha character "39" codes.

The program also accounts for serial-number items and prompts you whenever they enter and leave your inventory. A separate database record is available for each serial number item.

You can have up to seven different selling prices, and you can price via formulas using functions within the program. For example, you can price an item at suggested retail price, retail price less 20 percent, retail price less 20 percent less 10 percent, or cost of the item plus 50 percent. The program also offers IF-THEN expressions, date functions, and relational operators (equal to, less than, less than or equal, and so on).

To add items to inventory without scanning, you can type in the vendor

ID number and the order item ID number or you can select the vendor and items from pop-up screens (arranged either by ID number or in alphabetical order). To add new items to the inventory list, you type in an ID number, a description, and a price on an order form; and the program calculates the amount based on the item price and quantity ordered. The next time you use the inventory list, the item appears automatically.

You can also order items from a vendor card. By clicking on the Items icon at the bottom of the vendor card you can see a list of items supplied by the vendor.

Item records contain complete information, including a description, the preferred vendor (which you can change at any time), last cost, average cost, suggested retail, your retail, stock on hand, stock on order, maximum stock, and reorder point. You can also create automatic reorders from the Item screen when stock has been reduced to a certain point.

The item ledger card also has four icons that let you move immediately to the serial number screen, the components screen (for subassemblies), the vendor list, or an order form.

The standard inventory valuation is by average unit cost of all items on hand, with other valuation forms (LIFO, for example) requiring some extra effort. Inventory-Analyzer also allows you to set up various sales-commission codes, with each item carrying its own designated code.

When you create inventory orders, you have the option of posting each order individually, posting in batches, or posting in the background. Since POS-IM takes about 40 seconds to print and post each order, you might prefer to choose either batch or background posting.

Making a Sale

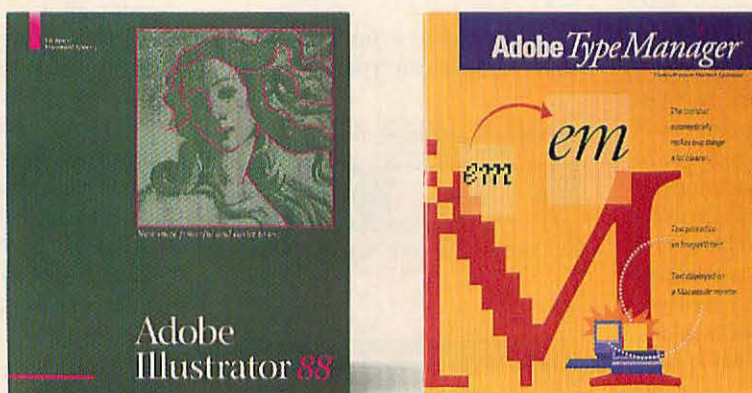
Because point-of-sale activity is less complex than inventory control, most salespeople can easily be trained in these procedures.

Once a customer file is located (or created), the salesperson merely writes the invoice on an invoice voucher screen that resembles a paper invoice form (see "The Sales Invoice Form"). (continues)

The Sales Invoice Form

POS-IM's sales invoice form resembles a paper form and is easy to complete. Sale items may be entered by scanner or bar-code reader, by selecting from a pop-up sales-item list, or by typing the item ID number in the appropriate column. When the invoice is complete, the salesperson clicks on the Calc icon (bottom left) to calculate the totals and the Sale icon to move to the payment form. The third icon is for scanned or bar-code data.

What's new with Adobe Illustrator 88?



For a limited time, when you buy Adobe Illustrator 88™ software, Adobe Type Manager™ software comes along with it, free. So if you want the drawing program used by professional designers and illustrators, buy it now. While you can also improve your type's screen image—without spending a dime. Call 1-800-344-8335 to find your nearest Adobe Authorized Dealer today.

Because what's new today is gone tomorrow.

ADOBE®



POSTSCRIPT®
Software From Adobe

Look for this symbol on computers, printers and other products that include PostScript software from Adobe Systems. It's your guarantee of quality and compatibility.

The Adobe logo and the PostScript logo are registered trademarks and Adobe Type Manager, the ATM logo, Adobe Illustrator 88 and the Adobe Illustrator logo are trademarks of Adobe Systems Incorporated in the U.S.A. © 1990 Adobe Systems Incorporated. All rights reserved.

For cash transactions no customer ID is required, and the salesperson enters the cash payment directly on the form.

Upon completion and posting of a sale, all inventory and customer records are immediately updated. POS-IM can also process returns, transfers, labor charges, back orders, gift certificates, and other options in a similar manner. Invoices can also be placed on hold and completed later.

After an invoice is written, credit sales post to the Accounts Receivable ledger. The A/R ledger—which charges interest on past-due accounts, prints statements, and provides reports on receivables—is the easiest module to use. If you link to the Insight Expert A/R module, you can track receivables in that program.

Reports

You can print merchandise labels and a complete range of reports; on-hand, on-order, and reorder reports for inventory; sales and commission reports; and the usual aged-receivables report. In addition, you can create custom reports by merely copying fields onto the report much as you would move a DA with Font/DA Mover. Custom grids can be used for creating reports that contain items requiring two descriptions (for example, size and color or style and size). Reports can also be saved to a disk file and imported as text to a spreadsheet application where you can rearrange the data or create specialized charts for enhanced formatting.

POS-IM includes a useful Utility file that can be used for setting passwords, checking and repairing databases, or copying databases and rebuilding their indexes.

My main complaint, which is a relatively minor one, is that the program should include information on memory requirements. Businesses with large inventories and several other programs might have to look at expanding hard disk capacity to accommodate the program. Ensign Systems says that data is limited only by disk size and that data can even be spread over additional peripheral hard disks (or hard disk partitions). My only other criticism is the lack of indexes in the documentation.

On the Whole

If you are managing a heavy or complex inventory manually because you can't afford a minicomputer, or if you're using a personal computer and think you'll soon have to move to heavier hardware, or if you're using a minicomputer and would like to reduce your costs significantly, take a good look at POS-IM. The program is sophisticated and powerful, and its excellent Mac interface makes point-of-sale and inventory control about as easy as these difficult jobs can be. Ensign Systems hasn't left much out of this excellent program.—**Alan L. Slay**

See Where to Buy or circle 818 on reader service card.

PostScript Printer

FUJITSU RX7100PS

Pros: HP LaserJet II emulation; small footprint; second paper bin available.

Cons: Cannot feed envelopes; solid blacks lack density. **Company:** Fujitsu America.

Requires: Mac Plus. **List price:** 2MB \$3995; 4MB RX7100PS + \$4795.



The first thing I noticed about the Fujitsu RX7100PS is that it sure doesn't look like a laser printer. It has the small footprint, light weight, low profile, and upright sheet-feeder design typical of impact dot matrix printers.

The RX7100PS is a true PostScript page printer, with the same AppleTalk interface, 300-dots-per-inch resolution, built-in fonts, and xerographic imaging system found on the Apple LaserWriter. The Fujitsu printer also includes some nice touches, like an easy-to-read alphanumeric status display and setup menu, an optional software-controlled second paper bin, and built-in emulation of Hewlett-Packard LaserJet series printers (an important plus if the printer might be needed in an MS-DOS environment). But it's not really a laser printer. Fujitsu has replaced the semiconductor laser and rotating mirror used in laser printers with an array of light emitting diodes (LEDs). By simplifying the optics and reducing the size of the xerographic print engine, Fujitsu has squeezed the functionality of a LaserWriter into a package smaller in every dimension, a



Fujitsu RX7100PS

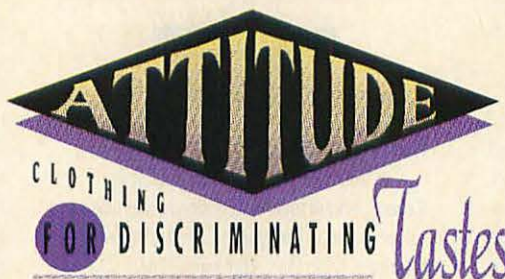
pound lighter, and somewhat cheaper than a LaserWriter IINT.

There are some trade-offs, however. While the print engine in a LaserWriter II is rated at 8 pages per minute (ppm), the RX7100PS's engine is only rated at 5 ppm. Whether that is significant depends on how the printer is used. Unless you are printing multiple copies of the same page, most PostScript printers are limited not by the engine speed, but by the speed of the PostScript interpreter. The RX7100PS's PostScript interpreter runs slightly faster than the LaserWriter's, so the time required to print a single page is about the same. Only when printing multiple copies of the same document, or long documents that consist entirely of text without a lot of formatting, is the slower engine in the Fujitsu printer noticeably different.

Much of what I print eventually gets mailed; I need to print an envelope for every three to six single sheets. The RX7100PS, with its optional software-controlled second paper bin, seemed like a natural for my environment. I could load up one bin with paper and another with envelopes, and print letters and envelopes on the fly. The first problem I encountered was that the Macintosh LaserWriter driver doesn't have a provision for controlling dual bins. You can select the bins from the front panel, or even instruct the printer to automatically switch bins when one becomes empty, but you cannot switch bins from the Macintosh. A bigger problem is that, according to the manual, the Fujitsu printer cannot accept envelopes. I ignored the warnings and attempted all kinds of (continues)

Start with type. End up with style.

Now Supports
Adobe®
Fonts



With TypeStyler™ and your Macintosh® you can turn type into an exciting tour de force.

It lets you create dramatic designs that once were possible only with custom illustrations and the most expensive typesetting facilities.

Bend. Twist. Stretch. Rotate. Then, call on an amazing range of styling effects. Fades, gradient and starburst fills. Shadows and patterns. Inlines and outlines. Circular text. Plus a library of background panels that you can shape and style as well.

It's powerful, yes. But it's not overpowering. TypeStyler is amazingly easy to learn and use.

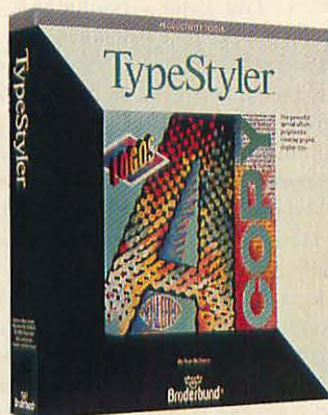
You can even import and export PICT, Paint and EPS file formats.

And export Adobe Illustrator™ outlines. Which means TypeStyler is fully compatible with most popular desktop publishing applications.

In addition, TypeStyler comes with 10 AGFA Compugraphic® typefaces. And you can also work with thousands of other commercially available fonts including Adobe®. All for an introductory price of \$199.95.

Get TypeStyler. And get the difference between type and style.

Available for Macintosh Plus/SE/II/III. Two 800K floppy disk drives or hard disk. System 4.2 or later version.



Broderbund®

Copyright 1990 Broderbund Software, 17 Paul Drive, San Rafael CA 94903-2101. All rights reserved.

SEE YOUR LOCAL RETAILER OR CALL 800-521-6263.

Macintosh, AGFA Compugraphic, Adobe and Broderbund are registered trademarks of Apple Computer, Inc., AGFA Corporation, Adobe Systems, Inc. and Broderbund Software, Inc., respectively. Adobe Illustrator and TypeStyler are trademarks of Adobe Systems, Inc. and Broderbund Software, Inc., respectively.

Dealers circle 231 on reader service card

End users circle 240 on reader service card

tricks for getting the RX7100PS to accept an envelope, all to no avail. I can't even print envelopes using the manual feed. So if your printing needs include a lot of envelopes, this could be a real drawback. Otherwise the paper handling is good. The upright paper bins are easy to check and load, and while they did seem to feed double sheets a bit more often than other printers, the only time I succeeded in causing a paper jam was when I tried to feed an envelope.

The Fujitsu engine uses a single cartridge to replace the toner and electrostatic imaging surface (\$185 replacement cost for approximately 6000 pages). It's a little easier to change a Fujitsu cartridge than it is to change the cartridge on Canon engines (the engine used in the LaserWriter II and many other printers) because of the wide-open design of the RX7100PS. The design also makes clearing the rare paper jams a breeze. Unfortunately, the engine produces blacks that aren't as sharp and dense as those from printers based on the Canon engine. The quality is generally acceptable for text, but documents with large solid black areas aren't as clear and even as they might be, and changing the setting of the front-panel density control doesn't help.

The documentation and support materials are excellent, though the printer design is self-explanatory. As with all PostScript printers I've seen to date, the RX7100PS does not come with PostScript screen fonts on disk, which increases the difficulty of proper printer installation by at least an order of magnitude.

Recommend But...

I want to be able to recommend this printer. The RX7100PS is the friendliest PostScript page printer I have seen to date. It is small, quiet, reliable, and easy to understand. It could be a favorite of mine, in spite of its tendency to print less-than-perfect solids. Unfortunately, my need for a printer that will conveniently print envelopes outweighs my need for friendliness. Before choosing the RX7100PS, consider carefully how important dense solids and the ability to print envelopes are to you. —Ron Risley

See Where to Buy for contact information.

★ Music-Notation Program

MUSICPROSE 1.0

Pros: Easy to use; many semiautomatic features; easy transposition of chords and placement of markings; fast.

Cons: No tool for setting length of rests; no Undo command; can't extract parts.

Company: Coda Music Software.

Requires: Mac Plus; second disk drive. Hard disk recommended. **List price:** \$249.



Music-publishing programs for the Mac have been an endless source of aggravation for many musicians. None of the high-end programs widely available really present a viable solution for the working musician who simply needs to print up a lead sheet or horn chart. What has long been missing from the market is a midrange program that transcribes music as it is being played, imports files from a MIDI sequencer program, and offers a suitable array of page-layout tools to produce output that's ready to be published. Coda Software's new MusicProse, based on the company's high-end program Finale, offers the right set of features at a moderate price.

Enter without Knocking

Prospective users of a desktop music-publishing system tend to want one thing more than any other: the ability to automatically transcribe music from a keyboard played in real time. MusicProse's HyperScribe mode allows just that. You play music on a MIDI-equipped instrument, provide your own tempo reference by tapping a footswitch, and HyperScribe accurately transcribes every note. If you prefer

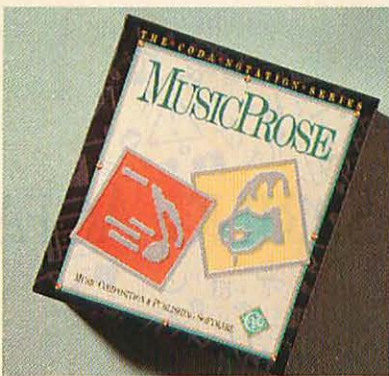
you can play to a steady metronome click, but providing your own tempo reference allows you to play *rubato* phrases and still obtain an accurate transcription.

In addition to real-time transcription, MusicProse offers two other input methods under the Entry menu. In Simple Entry mode, you select a note value (quarter note, eighth note, and so on) from a floating palette or the numerical keypad and simply click on the score to enter notes. Speedy Entry is similar, with the added ability to use the Mac keyboard's arrow keys to move about on the score and select pitches (pitches can also be entered from a MIDI instrument). This is very similar to the step-recording function found on most sequencer programs, and it works quite well. The only strange aspect to MusicProse's Simple and Speedy entry modes is that there are no tools for adding rests of various durations; you must first add a note of the desired value and then use the eraser tool (or the Enter key in Speedy mode) to change the note into a rest. While this works just fine, it would be more intuitive to enter rests in the same way as notes, by choosing them from a palette.

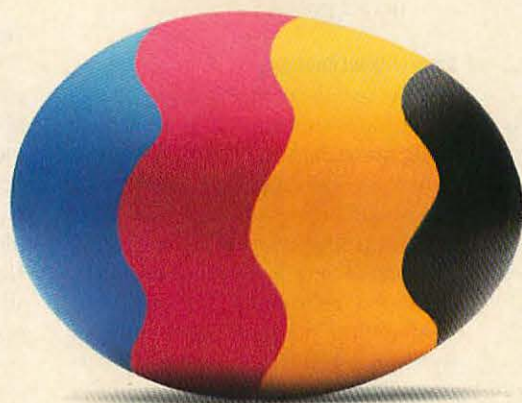
Beyond the Entry

MusicProse gives you eight main tools, each of which has a pull-down menu of its own. The Staff, Measure, and Page menus have commands that affect the position, size, and other attributes of staff systems, measures, and text blocks. Commands like Fit Music and Lay Out Measures let you perform some incredibly useful semiautomatic operations that, for instance, stretch out overly dense measures and help avoid horizontal overlap between lyrics. Staff Transposition is a saving grace for composers because it can transpose a staff for B-flat clarinet, for instance, and play the notes as they should sound, not as they look on the screen (see "Transposing Chords").

The Measure menu is where you'll find commands for copying and pasting chunks of music and setting rehearsal marks, measure numbers, and alternate notation symbols such as slash note heads for notating percussion. Any range of measures can be



MARK JOHANN



ARRIVING THIS SPRING: AGFA COMPUGRAPHIC'S



NEW POSTSCRIPT[®] IMAGESETTERS. **AGFA** 

Circle 460 on reader service card

transposed, and can have its own key signature, clef, meter, and style of bar lines. Measure mode forgivably departs from normal Macintosh conventions in that you don't need to use any keys or commands to copy and paste a region of measures: you just select the range to be copied and drag it to the desired destination.

Express Yourself

You choose markings such as slurs, crescendos, pedal, and dynamic symbols, and text expressions like *Allegro* from four floating palettes accessed from the Expression menu. Simply click on the palette to choose a symbol, and then double-click on the score where you want the symbol to appear. All of these symbols can be freely positioned; slurs, crescendos and decrescendos, and octave markings can be stretched and resized with handles similar to those found in most drawing programs.

With MusicProse you can also edit and analyze any chord, and the program provides the appropriate chord symbol automatically. You can edit chords either using MIDI input or via an onscreen music keyboard. Chord symbols, including guitar fingerboard symbols, are entered using the Chord menu. In addition, there is a user-definable library of chord symbols and suffixes.

Dealing with on-screen lyrics is a breeze, thanks to the Click Assignment function under the Lyric menu. After lyrics are entered, each syllable can be assigned to a specific note entry by clicking on the score. This ensures that each syllable aligns properly underneath the note it's intended for, and

that it stays that way throughout any repositioning of staves and measures.

Import and Export Duties

MusicProse can import and export any file that supports the standard MIDI File format, although all ornaments and expression markings will have to be added by hand. It's also possible to compile a PostScript listing, or to export an encapsulated PostScript file to programs like Aldus FreeHand or PageMaker so you can incorporate your score into other documents.

MusicProse fully supports laser printer output, although the outline versions of Coda's Petrucci and Seville fonts cost an extra \$89 to registered MusicProse owners. Screen fonts are included with the program.

Upscale, but Midrange

MusicProse's note-entry and page-layout features rival in elegance those of other applications costing considerably more, but the program does have a few limitations. For instance, a score can have no more than 8 staves; other programs offer 16 or more. Furthermore, you cannot automatically extract and print separate parts; you must save separate files and delete all but one instrument from each. And there is no mode for fine-tuning placement of notes; other programs have a mode in which every symbol on a page can be repositioned precisely. And since exported EPS files cannot be ungrouped, you will have to settle for the default placement of most notes. Finally, MusicProse has one unforgivable shortcoming: there is no Undo command.

Despite the missing Undo command, the lack of a draw mode, program-style object-placement mode, and the eight-staff limitation, MusicProse is a solid program with a reasonably streamlined interface and a healthy set of well-thought-out defaults. MusicProse is probably the best choice for anyone who needs no more than eight staves per score, and is a sensible solution for sequencer users who simply want to print lead sheets, horn charts, and the like. It is flexible, fast, and not at all confusing; compared to its competition, that's saying a lot.

—Charles Clouser

See Where to Buy or circle 801 on reader service card.



Digitizing Tablets

KURTA STUDIO FOR ALDUS PRODUCTS

Pros: Full optimization for efficient use of Aldus software; lifetime warranty; tool icons laid out adjacent to drawing area. **Cons:** Proportionally small drawing area; clunky stylus.

Company: Kurta Corporation.

Requires: Mac SE. **List price:** \$1295.

PERSONAL WRITER PW10 SL

Pros: Easy macro recording; sleek, lightweight design; proportionally large drawing area. **Cons:** Small command buttons. **Company:** Personal Writer.

Requires: Mac 512KE. **List price:** \$799.

WACOM SD-420L

Pros: Cordless, slim, pressure-sensitive stylus. **Cons:** Heavy; scant support for pressure feature. **Company:** Wacom.

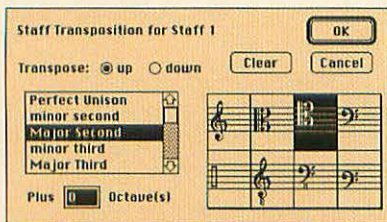
Requires: Mac Plus. **List price:** \$795.



Digitizing tablets are designed to be an artist's keyboard, the ultimate input device for transporting a designer's creative cargo to the screen. The three tablets I evaluated—from Personal Writer, Kurta, and Wacom—approached this ideal from different angles. Nevertheless, I can recommend all three in good conscience, though each would go to a different artist with different needs.

The distinction between these tablets lies more in task orientation than in performance quality. All are high-resolution, highly responsive input devices. And once you've installed the driver software and set the DIP switches, there are few surprises. Choosing the right tablet is more a matter of feature preference than of avoiding any drawbacks.

All three companies include driver software with their tablets and let you choose from several pointing-device options: corded pen, cordless pen, or button cursor. Personal Writer and Wacom offer tablets in a variety of sizes in addition to the ones I reviewed. (continues)



Transposing Chords

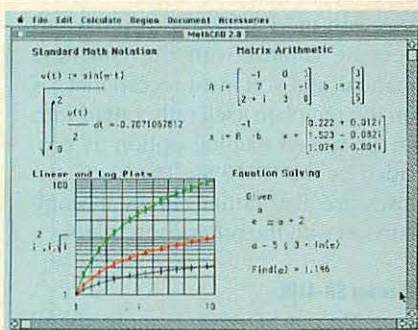
This dialog box lets users set a transposition for notes displayed in any staff, without changing the pitches associated with that staff. This means you can set transpositions for instruments that are not in the key of C, without changing the pitches that will sound on playback.

After centuries of practice, mankind perfects engineering calculations: MathCAD.

Announcing MathCAD: A Calculating Renaissance For Your Mac.

What the historians will call it, only time will tell.

Perhaps the Century of Speed, or the Era of Ease. But whatever the name, this is the age of MathCAD, the only math package that looks and works the way you think.

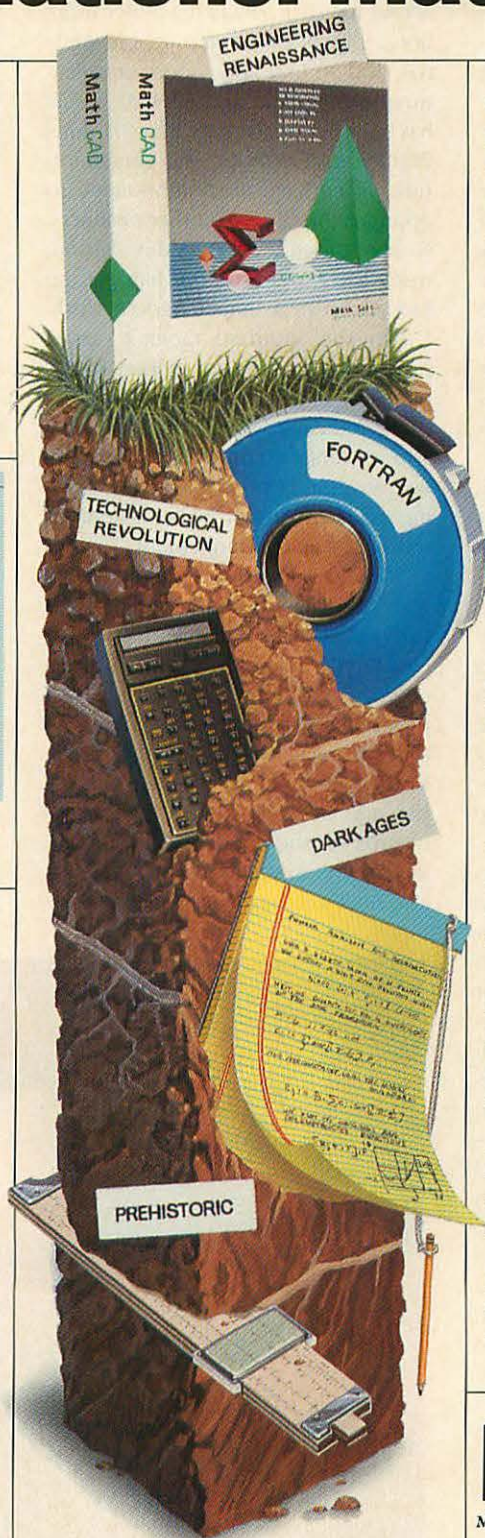


MathCAD takes full advantage of the Macintosh® interface, with features that make it simple to enter operators and Greek letters into equations.

MathCAD is the best selling math software in the world because it lets you perform engineering and scientific calculations in a way that's faster, more natural and less error-prone than the way you're doing them now—whether you're using a scratchpad, calculator, spreadsheet, or program that you wrote yourself. It gives you more control and more flexibility than ever before.

MathCAD's live document interface™ lets you enter equations anywhere on the screen, add text, and graph the results. Then print your analysis as a presentation quality document.

And it has over 120 commonly



used functions built right in, for handling all kinds of equations and formulas, as well as exponentials, differentials, cubic splines, FFTs and matrices.

No matter what kind of work you do, MathCAD has a solution for you. In fact, it's used by over 50,000 engineers and scientists, including electrical, industrial, and mechanical engineers, physicists, biologists, and economists.

But don't take our word for it. Just recently MathCAD was reviewed as being "everything you have ever dreamed about in a mathematical toolbox." And when it was compared to the competition, it was "MathCAD by a mile."

And if you work with an IBM® PC or compatible, there's a MathCAD version designed exclusively for you. Or if you use both Macs and PCs, don't worry: MathCAD files are completely compatible between the two.

Look for MathCAD at your local software dealer. Or call MathSoft at 1-800-MATHCAD (in MA, 617-577-1017) for more information or for a free demo disk.

Speed, power and flexibility. Enter the new era of engineering and scientific calculations, with MathCAD.

System Requirements: Apple Macintosh Plus, SE or II, with a minimum of 1MB RAM. Supports all ImageWriters® and LaserWriters®.

MathCAD®

MathSoft, Inc. One Kendall Square, Cambridge, MA 02139

Personal Writer also offers a tablet with optical-character-recognition (OCR) software that, according to Personal Writer, translates handwriting into typewritten data. One of Wacom's tablets offers a static-hold option that keeps a piece of paper or an overlay in place. The Kurta Studio for Aldus Products is preprogrammed, and it's customizable enough to do everything but mail in the registration card for you.

Personal Writer PW10 SL

The lightweight, space-efficient Personal Writer PW10 SL is the general-purpose tablet of the group. A handy tilt bar lets you adjust the tablet to lie flat or at a comfortable drawing angle of 6 degrees. The corded stylus is slim and highly responsive and has ink cartridges for drawing on paper. The tablet has a cork surface to hold the paper or an overlay in place.

A 2½-inch strip along the left side contains the PW10 SL's "cockpit"; it even has a tiny keyboard for entering minimal text (such as a file name) without leaving the tablet. The controls—a comprehensive array of macro buttons and sets, menu-command buttons (Quit, Save, Cut, and Paste), and so forth—are sensibly arranged but are too small. Even after practice, I could perform few operations without looking down at the tablet to check my position.

The PW10 SL lets you define up to 400 macros (10 sets of 40 each). The control area features 40 macro buttons; below these are 10 more buttons, which let you choose which set of macros is currently operating. Fortunately, you can name both individual macros and macro sets as you define them. Still, I'm skeptical about the usefulness of this vast empty arsenal—achieving full macro functionality could take a great many hours, even though the recording procedure is simple to learn.

The control strip also contains a mouse area for keeping your place in the active area of a drawing tablet. In addition, the mouse area allows you to select objects rapidly in drawing programs or to access that one menu item for which you neglected to record a macro.

The PW10 SL also has a scaling feature, another handy way to work

with unwieldy sketches or renderings. The tablet allows you to adjust the live drawing area to proportionally match the size of your drawing.

Kurta Studio for Aldus Products

The Kurta Studio for Aldus Products allows for basic digitizing-tablet functions, plenty of programmable macros, and scaling and mouse-area features comparable to the PW10 SL's. It has been optimized to work with Aldus PageMaker, FreeHand, and Persuasion (and plans have been announced to optimize the tablet for other products, so stay tuned). To an Aldus faithful, using the Kurta Studio is like getting picked up in a limo to go to work. Under the standard tablet's plastic protective sheet rests a glossy heavy paper overlay with commands for all three Aldus programs; font options; and universal commands such as Revert, Save, and Undo. Around the drawing area are icons for the familiar Aldus tools—a handy arrangement.

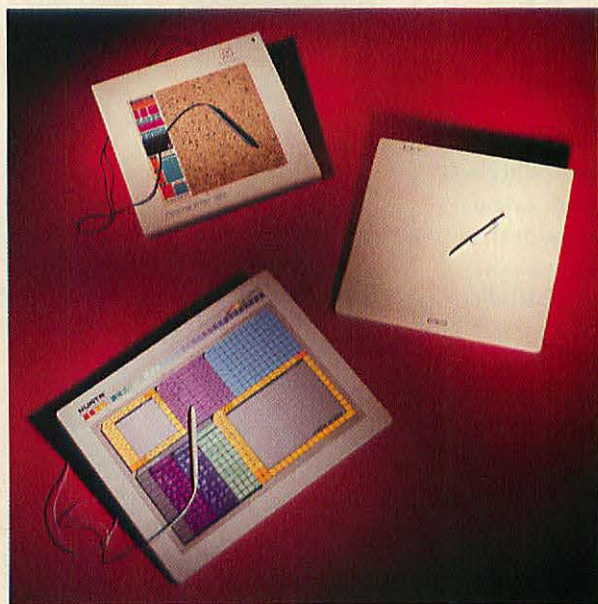
The Kurta Studio comes equipped with preprogrammed commands for the Aldus trio and CE Software's QuicKeys, a macro program, which encourages additional customization and programming of the 23 function keys that lie along the top of the tablet. Kurta even includes a permanent-ink pen and labels for identifying custom macros on the overlay. The function key row is a standard Kurta design, also built into its low-end models.

The Kurta Studio's drawing area is somewhat miserly. While the PW10 SL controls are too small, certain of the Kurta Studio's are too big—at the expense of live drawing area. This also means lots of travel time for hand and stylus. The drawing area corresponds to Mac SE screen size; rather than accommodating larger monitors.

At 12 by 17 inches the Kurta Studio is the largest of Kurta's tablets. The Aldus-optimized overlay is described in the manual as a template. You can disable the overlay and still keep the function-key macros operable. The discussion of macro-recording options and the use of the term *template* was somewhat confusing. The tablet also requires the installation of two sets of software (three if you count QuicKeys.) And in fact, the entire process of macro recording is unduly complex, especially in comparison with the PW10 SL's. You have to become familiar with the QuicKeys manual, and you must record macros on the template itself rather than with an on-screen naming option as provided by the PW10 SL. The Kurta styluses are also rather clunky in comparison with the other contenders.

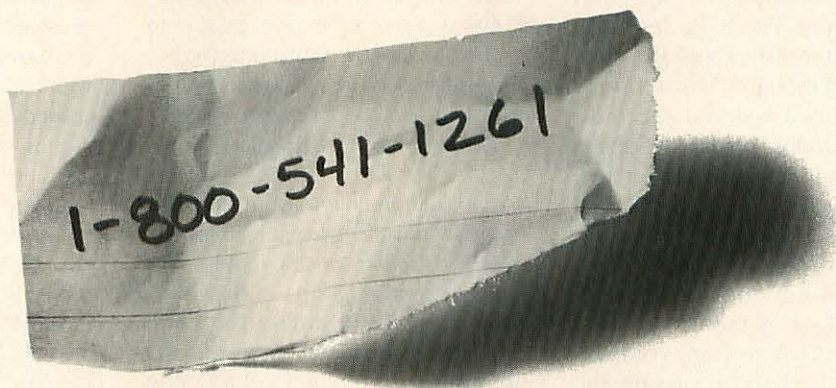
Wacom SD-420L

The Wacom SD-420L is more useful for drawing and sketching than for drafting or technical applications. What makes the SD-420L a magic slate is its *(continues)*



Three digitizing tablets: the Personal Writer PW10 SL (top), the Kurta Studio for Aldus Products (bottom), and the Wacom SD-420L (right).

MARK JOHANN



With a simple 11-digit code, you can access virtually every computer in your corporation.

No, this isn't an appeal to some bizarre group of computer hackers. Rather, it's an invitation to dial the number shown above.



By doing so, we'll send you our comprehensive report on electronic mail technology. And you'll discover how easy it is to get people communicating across the entire corporation.

Regardless of the hardware platform or electronic mail systems in place.

The reason, quite simply, is Microsoft® Mail version 2.0 for AppleTalk® networks has hooked up with the industry's leading connectivity vendors.

Now, thanks to Soft-Switch it's possible to link Mail 2.0 to most major email systems, including PROFS®. While with Alisa Systems or Pacer Software, you can connect to VAX® based systems. Even use the VAX as a Mail 2.0 server. And through Touch Communications, enterprise-wide messaging with X.400 is just a gateway away.

So hook up with us. You'll find we're a solution worth tapping.

Microsoft®
Making it all make sense®

For more information, call (800) 541-1261, Dept. K77. Outside the U.S. and Canada, call (206) 882-8661. In Canada, call (416) 673-7638. ©1990 Microsoft Corporation. All rights reserved. Microsoft and the Microsoft logo are registered trademarks and Making it all make sense is a trademark of Microsoft Corporation. PROFS is a registered trademark of International Business Machines Corporation. AppleTalk is a registered trademark of Apple Computer, Inc. VAX is a registered trademark of Digital Equipment Corporation.

cordless, pressure-sensitive stylus. Simply put, the slim, superbly streamlined stylus responds to pressure so that as you move the stylus across the tablet you lay down thicker lines with heavier pressure and thinner lines with lighter pressure. The stylus responds just like a paintbrush or a stick of charcoal. At first I thought I'd just lost my objectivity, but I watched the most jaded, technically savvy artists shake their heads and grin as they sketched using the SD-420L. When I reviewed the tablet, only Wacom's demo drawing program took advantage of the pressure feature, but Deneba Software's UltraPaint is the first of what Wacom hopes will be many commercial applications incorporating the technology.

The design of the Wacom tablet, especially in contrast to those of the Personal Writer and Kurta tablets, is zenlike and unpretentious. There are, however, a few peas under the mattress. The SD-420L is heavy—nearly 10 pounds—outweighing the other two tablets by a long shot. (In contrast, Wacom's latest SD-510 6-by-9-inch tablet weighs in at a sprightly 1.9 pounds). And I found the packaging and advertising somewhat misleading. Wacom's literature always refers to the SD-420L as a "cordless digitizing tablet." In fact, it requires two cords, one to the Mac and one to an electrical outlet; only the stylus is cordless, and I wish they'd just say that.

Each of the tablets I looked at has the potential to be a primary tool for an artist or designer. I was impressed by the hand-to-screen accuracy of all, having worked with tablets in the past that had flutters or that sent wild signals with the slightest slip of the pointing device. As I worked with the tablets and watched other artists become accustomed to them, it was encouraging to see moderately priced, desktop-sized tablets holding their own against the sketch-and-scan and mouse-drawing methods many designers have cultivated. It seems possible that a wide variety of visual artists might soon enjoy an easier path from concept to on-screen realization.

—Annie Jenkel

See Where to Buy or circle 781 (Kurta Studio), 814 (Personal Writer), 863 (Wacom) on reader service card.

★
Arcade-Style Game

LEPRECHAUN 2.6

Pros: Addictive; easy to learn, yet difficult to master; supports 256 colors; game editor included. **Cons:** No solutions supplied; user-created levels may have no solutions; can't use arrow keys. **Company:** Shodan.

Requires: Mac Plus. **List price:** \$59.



Leprechaun is an addictive arcade-style game. It is spectacular in 256 colors, but looks almost as good—and plays as well—in black and white. The premise, to move the leprechaun king until he pushes a pot of gold onto a rainbow, is deceptively simple. There's more strategy involved than you think at first. Like all good arcade games, it's easy to learn, but difficult to master.

Do You Want to Play a Game?

Pushing the pot of gold onto the rainbow involves constantly avoiding such enemies as birds, trolls, troglodytes, and snails. Each moves in a specific fashion. Birds wander back and forth in straight lines; troglodytes wander aimlessly; snails move at random too, but slower than troglodytes; trolls are smart enough to follow you around. Contact with any of them kills the leprechaun king immediately. Most levels are studded with thorns, which also kill the king. Not everything is deadly; there are also shamrocks, which you can collect and throw at enemies. Each shamrock stuns an enemy for a few seconds, and throwing several of them

at a time freezes an enemy for longer. Finally, there are rocks and balloons, which can be pushed off ledges onto enemies.

The game is made up of scenarios, which are collections of levels; successfully completing one level allows you to move to the next. To get started with Leprechaun, the first scenario you should master is called Basic Techniques—a series of simple incremental learning levels that teach you skills that help you improve your score.

After mastering Basic Techniques, you can move on to the actual game. It has more than 100 levels, and after months of play, there are still many I haven't completed (see "The Cliff of Despair"). In some levels it's easy to push the pot of gold into a position that makes it impossible to move the pot onto the rainbow. Then you have to use the game's Abandon feature, which kills the king and starts the level over. You get four kings per game, but you earn an extra one for every 16 small pots of gold that you collect.

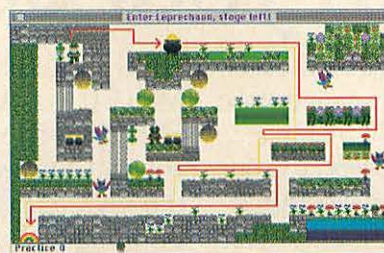
In case you manage to master all of the supplied levels, the game includes an editor that lets you create new levels and scenarios that are as complex or as simple as you like. Unfortunately, there is no way of checking if the level you create is indeed solvable. Leprechaun comes with a scenario entitled Kiddy Land. It's chock-full of adorable sounds—the squeal of the birds and the squishy sound the falling rocks make when they kill an enemy.

I have only a couple of gripes about Leprechaun. First, no solutions are provided for the supplied scenarios. If you can't figure out how to solve a level, you're stuck. Hints would help. Although the king can be controlled with the mouse or user-configurable keys, the arrow keys, which I prefer for games like this, cannot be used.

But these are minor quibbles. Leprechaun is a winner in my book—an enjoyable, intriguing, and thoughtfully designed game. It's also extremely addictive. Gamers young and old will find themselves slinking back to the Mac at all hours, muttering, "I'll just play one more game. Really. Just one."

—Bob LeVitus

See Where to Buy or circle 782 on reader service card.



The Cliff of Despair

Pushing the pot of gold the wrong way (in this case, to the right) can make it impossible to complete the level. The leprechaun's path is shown in red. To win this level the player must push the pot along the path indicated in gold. (Note: The red and gold path lines have been drawn in and do not appear in the program.)

Chaos Management Now!

Introducing

KeyPlan™

The Key To Getting Things Done



From Outline to Deadline

- **Good plans start with simple Outlines!**
 Only KeyPlan allows you to outline what needs to be done and quickly turn it into a full-blown plan.
- **Turn your outline into a Flow Chart!**
 Only KeyPlan allows you to quickly turn your outlines into Plan Views. Real PERT graphs that show the dependencies of the steps in your outline.
- **Click the mouse and now it's a Timeline!**
 KeyPlan™ also provides instant Bar Plan Views (GANTTs). Fully flexible and totally integrated with the outline and other Views.
- **Click again and make instant Charts and Graphs!**
 Graphing is built-in, with presentation-quality area graphs, line graphs, bar charts and scattergrams. Powerful, flexible, and easy!
- **Create Reports on any aspect of your plan!**
 List View allows unlimited custom reports using your own criteria. Export the data to any spread sheet or word processing program.
- **You can easily track Costs and Revenues!**
 Optimizer provides instant continuous monitoring of plan status in time and costs. Tracking monitors actual against planned timelines.
- **Resource List links to plan and all 5 Views!**
 Helps manage all the people and resources involved in the project. Information instantly updates all the other Views in KeyPlan™.

Stop feeling guilty about never liking the project management programs you've used. It wasn't just you. KeyPlan™ does project planning the way it should have been done. Turn fast outlines into successful deadlines. Any plan, no matter how big, can be viewed in many ways—instantly.

Speed and ease of use for the light user; power and sophistication for the professional Project Manager. KeyPlan™...the key to getting things done.

Call:
800/624-2485
Toll Free
 Only \$10 for your complete KeyPlan Demo.

Symmetry



8603 E. Royal Palm Rd. • Suite 110 • Scottsdale, AZ 85258 • (602) 998-9106 • Applelink: D0031

Circle 302 on reader service card

★
Custom On-Screen Calculator Tool KitCALCULATOR
CONSTRUCTION
SET 2.06

Pros: Many useful calculation, conversion, and display functions; calculator functions and appearance easy to design; straightforward programming language; excellent compatibility with HP-41C calculators. **Cons:** Lacks standard Undo and Cut, Copy, and Paste features for calculator design functions; lacks built-in conversion and display functions for weight and volume. **Company:** Dubl-Click Software. **Requires:** 128K Mac. System 6.03 recommended. **List price:** \$89.95.



When Dubl-Click Software subtitled its upgrade to Calculator Construction Set (CCS) "the 2.0 Power Version," they weren't fooling around. CCS 2.0 is a rich system for creating custom software calculators. Few people will fully exploit its mathematical potential, but no matter: CCS remains accessible enough for anyone who needs even a little boost in calculating power.

Calculator du Jour

CCS starts with the unarguable premise that no one calculator is right for everyone and takes this axiom to its ultimate conclusion. The program's first line of attack is simply to supply completed calculators that you can immediately put to use. Included in the 61-member potpourri are near-perfect emulations of several popular Hewlett-Packard programmable calculators; a calculator that adds, subtracts, and multiplies time (minutes and hours); one for balancing a checkbook; several converting calculators (from barrels of oil to quarts, degrees Kelvin to degrees Fahrenheit, and so on); and three different flavors of programmer's calculators. Among a grab bag of special-purpose machines, there's one that does typesetter's conversions, one that figures the rise and run of rafters, and a periodic table of the elements (click on an element, and you're given its atomic number and atomic mass). If you can put two or three of the prefab models to regular use, they

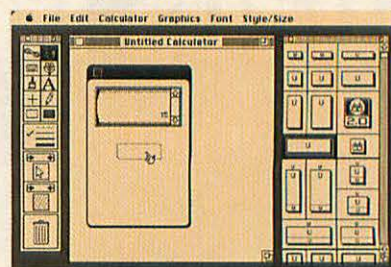
alone will justify CCS's purchase price. Nevertheless, it's the ability to build your own calculators that makes CCS so unique and so fascinating. You can start from an existing calculator, work from one of 15 supplied templates, or design your own new calculator from scratch. I used the first approach to expand one of the prefab programmer's calculators into one tailored to the needs of the PostScript programmer, featuring an octal notation display and conversions between the coordinate systems of PostScript and the ordinary measurements.

Build Your Own

No matter which approach you take, however, the mechanics of calculator design with Calculator Construction Set are simple and straightforward. A screen palette holds a miscellany of parts for your calculator: keys, buttons, and various display elements. All you do is drag the parts you want to add from the palette to their destination on the calculator (see "Calculated to Please"). Once a part is in place, you must then wire it to perform a particular function.

You can, for instance, hook up a key as a number or letter for input; as any of a myriad of built-in functions, from simple arithmetic operations to complex statistical calculations; or as a trigger for your own program (more later about programming with CCS). In fact, you can write external functions in C, Pascal, or assembler and call them from calculator keys. In the finished calculator, you activate each screen key by clicking on it, and if you design the appropriate connection, you can activate screen keys by pressing keys on the Mac's keyboard. You can label each key however you like, and you can place text and PICT graphics anywhere on the calculator.

Display parts include a variety of imitation LEDs (for showing single numbers), a scrolling facsimile of a paper-tape printout (that records all entries and calculations), and a monthly calendar. As with the keys, you can wire many of the LED readouts to suit your needs. For example, you can have separate LEDs showing the same value in different numeric systems, such as decimal, hexadecimal, octal, and binary notation. Just as eas-

**Calculated to Please**

Calculator Construction Set 2.0 provides two tool palettes, one for adding keys and display elements to your nascent calculator, the other for manipulating it, as shown on either side of the screen. The center of the screen is devoted to the work space in which you actually assemble the calculator.

ily, you can configure an LED to read out in hours and minutes, feet and inches, or yen. You can also wire LEDs to display the current value of any of CCS's 255 memory registers (temporary numeric parking places). Being able to see the numbers you've stored means you don't have to guess which memory register to recall during a complicated calculation.

Don't Make a Mistake

With all the flexibility of its design tools, it's surprising that the program lacks standard Macintosh editing functions. You can drag a selected calculator part around on the screen or dump it in a special trash can—but you can't cut, copy, or paste. Worse yet, there's no Undo command.

The CCS programming language has been overhauled to make it closely compatible with that of the HP-41C series calculators. That was a wise decision, since the 41C family is widely used by engineers and its language is a model of terse power. Though CCS still doesn't duplicate the HP language precisely, you'll be able to easily modify any existing 41C program to run on a CCS calculator. Besides, most of the remaining disparities represent improvements, additional CCS features not available in the 41C. For example, CCS boasts financial functions in abundance that are missing from the 41C. What's more, individual scripts (programs) can be as large as 32K in CCS, a size you can approach only with add-on memory modules in the 41C. Given the wealth of programming functions, and the fact that CCS lets you call one
(continues)

OUR MOST POPULAR PACKAGE

RUSH LEASE APPROVAL AND DELIVERY NATIONWIDE

LEASE

YOUR MAC!

BUSINESS LEASES AT AMERICA'S BEST RATES!

Macintosh IIcx
\$267 Per Mo.
deposit: \$570

- The power of success is here!
- Mac II cx Power
 - 105 MB Hard Drive
 - 8 MB Ram
 - 14" Color Monitor
 - Extended Keyboard
 - Quicker Kare
 - Extended Service (PACKAGE #LP22)
 - List price \$7500

MAC SE
\$132 Per Mo.
deposit: \$300

- "START UP" BUSINESS PACKAGE
Step up to a new level of efficiency
- Mac SE CPU
 - 65 MB Hard Drive
 - Extended Keyboard
 - Quicker Kare
 - Extended Service (PACKAGE #LP44)
 - List price \$3700

"EXECUTIVE" BUSINESS PACKAGE
Your powerful new executive assistant...

- Mac SE/30 Power
- 65 MB Hard Drive
- 5 MB Ram
- Extended Keyboard
- Quicker Kare
- Extended Service (PACKAGE #LP33)
- List price \$5400

MAC SE/30
\$191 Per Mo.
deposit: \$416

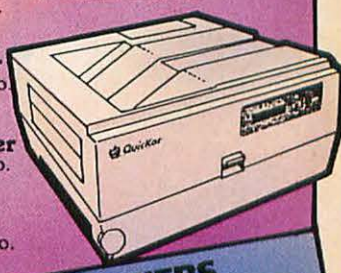
LEASING MAKES GOOD SENSE!

CONSIDER THESE ADVANTAGES:

- Leasing is FAST and EASY!
- Get more computer for your money -- Leasing costs less!
- Tax advantage (payments can be a deductible expense).
- Have the system you need NOW when you need it!
- Leasing lets you conserve your working capital.
- Equipment pays for itself.
- Have flexibility to expand.

- H.P. Desk Writer**
Lease for \$41 p/mo.
Initial deposit: \$117
Sell price list: \$1125
- NT 300dpi Laser**
Lease for \$153 p/mo.
Initial deposit: \$340
Sell price list: \$4287
- NTX 300dpi Laser**
Lease for \$221 p/mo.
Initial deposit: \$477
Sell price list: \$6200
- 400dpi Laser**
Lease for \$256 p/mo.
Initial deposit: \$548
Sell price list: \$7200

PRINTERS



SCANNERS

Xerox Data Copy 730GS
Lease for \$62 p/mo.
Deposit: \$158 Sell list: \$1700

MONITORS

- 19" Full Page Display**
Lease for \$62 p/mo.
Initial deposit: \$158 Sell list: \$1700
- 19" Sony Color Display**
Lease for \$180 p/mo.
Initial deposit: \$395 Sell list: \$5050



GRAPHICS PACKAGE

- ...the speed and sheer power to out-do yourself.
- Mac II ci FAST!
 - 105 MB Hard Drive
 - 8 MB Ram
 - 13" Color Monitor
 - 24 Bit Color Card
 - Extended Keyboard
 - Quicker Kare
 - Extended Service (PACKAGE #LP55)
 - List price \$9780

Macintosh IIfx
\$346 Per Mo.
deposit: \$728

BUSINESS PUBLISHING PACKAGE
The power to say it YOUR way...

- Mac II cx
- 105 MB Hard Drive
- 8 MB Ram
- 19" B/W Monitor
- 14" Color Monitor
- Extended Keyboard
- Quicker Kare
- Extended Service (PACKAGE #LP66)
- List price \$12000

HERE'S HOW:

Just call with your business info, trade references & bank contact. We'll quote your package and will ship your order the next day pending credit approval!

Business & Professional leases are straight month term with first and last prepaid and a \$1 buyout. All leases are subject to credit approval and a 2 year business history.



EATON FINANCIAL CORP.

Eaton Financial Corporation, with offices nationwide, saves you money by providing the most competitive and flexible leases available. Eaton Financial Corporation and MacFriends are working together to serve you even better! Join the many satisfied businesspeople who benefit by leasing their Mac systems from MacFriends.

WE SPECIALIZE IN MAC PRODUCTS. SEE OUR ADS ON PAGES: 28, 52, 250

MacFriends



DO YOU CARRY MACS?

NO, WE FIND IT'S FASTER TO SHIP THEM!

QUICKER KARE
• PARTS
• LABOR
• LOANER
• REPLACEMENT

EVERY LEASE COMES WITH 2 YEARS OF QUICKER KARE EXTENDED SERVICE!

CALL NOW TOLL FREE **800 331-1322**

• DAVID SCOTT RODWIN •

Those beautiful ideas in your head need to go on the overhead just as beautifully, but your artistic ability or the guy in graphics just won't cooperate.

But the 4693DX Color Image Printer will. It uses a 300-dpi thermal-wax process in 16.7 million colors so images and type are bright, glossy, and very impressive.

And it prints on paper or transparencies for presentations, overheads and comps, with infinitely more fiscal responsibility than pricey outside services.

The Tektronix 4693DX. It's the perfect printer to have up your sleeve. Call for more information, 1-800-835-6100 Dept. 1C, or fax to (503) 682-3408.



Tektronix®
The best and the brightest.

Magic without the markers.

Investors
EX

Taxable Bonds
CDs
Money Funds

Stocks



AGF Video Game Distributors

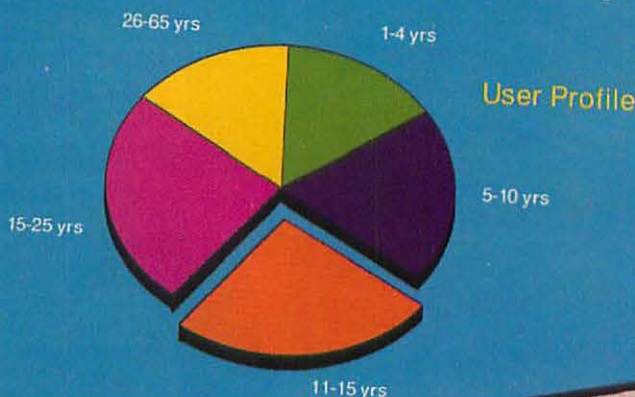
Quarterly Report

HOT GAMES

Nuclear Tornado
Death War
Whiz-Bang Buddies
Armor Snake

NOT SO HOT

Home Wrecker
Solar Sandwich
AtomAge Combat
Blip
Battling Banana Slugs



Copyright © 1989 Tektronix, Inc. All rights reserved. Mac is a registered trademark of Apple Computer, Inc. The documents in this ad were created by a blind-folded art director with one hand tied behind his back; Adobe Illustrator '88; a Mac II; and a Tektronix 4693DX Color Image Printer.

Circle 143 on reader service card

script from another, you can create extremely sophisticated and truly gargantuan programs. For further fun, you can wire a script to a particular key ahead of time, or design a calculator that can be programmed on the fly.

Once you've finished assembling a calculator, you just Save As to create either a DA or stand-alone application. CCS stores the editable version of the calculator in a third file type of its own.

You can't carry CCS in your pocket, and it doesn't have quite the convenience of a hardware calculator. In every other respect, however, this package is superior: it has better displays, a wider range of calculating functions, more memory, bigger programs—and the clincher, it can make your dream calculator a reality. If applied math is a necessity or a passion for you, Calculator Construction Set belongs in your software collection.

—Steve Cummings

See Where to Buy or circle 710 on reader service card.



Removable Hard Disk System

TRAVELLER 40MAC

Pros: Hard disk removes easily for transport or security. **Cons:** Separate power supply; additional cable required for SCSI daisy-chaining; no formatting or utility software supplied; expensive additional hard disk systems. **Company:** Aströ Systems.

Requires: Mac Plus. **List price:** \$1225; additional TravelPak 40MB disk \$1045; additional TravelPort base unit \$155; power supply \$115.



Removable hard disk systems offer three advantages over fixed hard disks. The first is transportability; you can remove the disk portion and put it in your briefcase, then insert it into a similar base unit at your destination. The second advantage is security; you take out the disk and lock it up for safekeeping. The last advantage is expandability; you can buy more disks for additional storage capacity.

Aströ Systems' Traveller 40Mac comes in three parts: a 40-megabyte hard disk in a plastic shell about the size of a James Michener paperback; a base unit; and a power supply. The TravelPak disk portion slides into the

TravelPort base unit, which receives power and data signals through a connector at the rear of the unit. The power supply is a box the size of your hand, with a line cord and a smaller cord leading to the base unit. The base unit has a power switch and one DB-25 SCSI connector on the back. Almost all other external Macintosh hard disks provide two SCSI connectors, so that you can easily daisy-chain additional SCSI devices. But in order to hook up more SCSI devices to the Traveller 40Mac, you must purchase an optional adapter cable from Aströ. Another annoyance is that when the Traveller is attached to an SE/30, the Mac's internal drive doesn't boot unless the Traveller is switched on. The drive also comes preformatted, loaded with Apple's system software, and preset to SCSI ID 1; there is no way for the user to change the SCSI ID, another unusual "feature."

Although the unit I tested had a 40MB 3½-inch Quantum drive mechanism, there are also 80MB and 100MB versions of the Traveller Mac. The Traveller's speed and performance were good, and the drive ran relatively quietly. The unit doesn't have a cooling fan, but running the Traveller 40Mac for several hours only made the case slightly warm to the touch.

Amazingly, Aströ Systems doesn't include disk-formatting software with the product. The technical support staff at the company told me that software is unnecessary because the hard disk comes preformatted, and that the company doesn't like to give the software out because it is "too easy" for Macintosh owners to destroy all their data with just a few clicks of the mouse. I then asked what I should do if the hard disk becomes corrupted, requir-

ing reformatting. I was told that a dealer could perform the service for me, or that Aströ would send the software upon request. No other software, such as disk utility or backup software, comes with the product. The documentation is poor, with only one page of the thin manual devoted to installation procedures for the Macintosh (although the company states that a new manual is in the works).

Home from the Office

The Traveller, however, isn't the only solution to the problem of moving data between two locations. Its primary competition is the removable 40MB hard disk cartridge system made by Syquest and marketed by a number of companies. And when compared to the Syquest drives, the Traveller 40Mac falls short in almost every category. The Syquest cartridges are smaller and lighter, yet hold the same amount of data. A Syquest drive with one cartridge sells for as little as \$799, with additional 40MB cartridges costing only \$99. An extra 40MB TravelPak costs \$1045. And should you want to carry a single TravelPak between home and office, a second TravelPort and power supply costs \$270. The total cost for a two-location solution is \$1495 for the Traveller, and \$1598 for two Syquest units. But you get an extra 40MB of storage when you buy the second Syquest drive, so it's clearly a better value. And you have the added bonus of being able to exchange Syquest cartridges with colleagues who also have these popular drives. The TravelPak has an edge in reliability, however; since it contains a sealed hard disk, it's less likely to fail than a Syquest cartridge, which is more susceptible to contamination.

Although the Traveller 40Mac ran well, because of its high cost, hardware annoyances, the missing formatting software, poor documentation, and mediocre support I can't recommend it to people who need to carry their data with them. Buying one of the many available Syquest cartridge drives is a better solution. Or you could even buy one of the smaller 40MB hard disks and put up with the inconvenience of dealing with the power cord and SCSI cables.—Tom Negrino

See Where to Buy or circle 847 on reader service card.



Aströ Systems' Traveller 40Mac

MARK JOHANN

Data Is Money. Deposit It Here.

DATAVault.™ **The 1.3GB DAT Backup** **System From Tecmar.**

The most important and valuable part of your computer system is the data itself. And there's no better place to deposit and protect it than DATAVault.

Here, dependable DAT technology and industry-standard DDS recording combine with a high-performance SCSI interface for the most versatile and reliable backup system yet.

DATAVault is truly an exceptional value. Compatibility with ISA, MCA and Macintosh® computers ensures flexibility regardless of your network

or workstation environment. And media costs are less than 3 cents per megabyte.

Data deposits and withdrawals are

quick and easy with a backup speed of up to 10MB per minute—and file access of 45 seconds across the entire 1.3GB tape. Plus, the software does it all automatically!

DATAVault. Backed by Tecmar's 16 years of quality products and services. And you can take that to the bank. For full details, call 800.624.8560.

TECMAR

Where Good Ideas Go To Work.

All Tecmar products are trademarks or registered trademarks of Tecmar. Other brand and product names are trademarks or registered trademarks of their respective companies.

©Copyright Tecmar, a subsidiary of Rexon, Inc., 1989. All rights reserved.

Circle 321 on reader service card

★
Plotting and Analysis Program

KALEIDAGRAPH 2.0

Pros: Fast plotting; provides full control of plot symbols, sizes, fonts; page view allows precise placement of plots; can save page layouts as PICT files; includes version that uses floating-point processor for 68020/030 Macs. **Cons:** No option to tile or stack windows. **Company:** Synergy Software. **Requires:** Mac Plus. **List price:** \$249.



When KaleidaGraph first came out over a year ago, its performance and many of its features were better than the best-selling graphing program at that time, Cricket Graph. Now Synergy Software (formerly Peripherals, Computers & Supplies) has made a good thing better with the release of version 2.0.

Improving on a Good Thing

KaleidaGraph includes line, scatter, and double-y plots, as well as probability, x - y probability, stacked histogram, box, and percentile plots. In addition to the polar, pie, and column plots found in version 1.1, KaleidaGraph now has horizontal bar and stacked bar plots. The line, scatter, double-y, and x - y probability plots can be assigned up to nine x variables.

When you start working with KaleidaGraph, you'll probably be struck by the similarity of its interface to Cricket Graph; when you double-click on an axis, for example, it displays a window with options for changing the tick interval, the format of the numbers, and so on. KaleidaGraph's data display is the now-common spreadsheet window.

Soon, however, you'll realize how different the two programs are. For instance, KaleidaGraph plots data faster than Cricket Graph (4 seconds for 500 points and 10 seconds for 2000 points with KaleidaGraph, versus 11 seconds and 10 minutes, respectively, with Cricket Graph). KaleidaGraph also offers new options for zooming and panning a plot as well as for selecting only certain data for plotting.

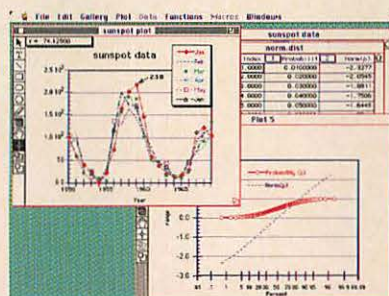
KaleidaGraph has a window that looks just like a regular programmable calculator. You can use this window to perform many types of calculations,

from simple math to exponential and logarithmic operations and vector manipulation. This calculator also enables you to create or modify macros. Macros can be saved in individual files—statistical analysis macros in one file and quality-control analysis macros in another file, for example.

Data with a Foreign Accent

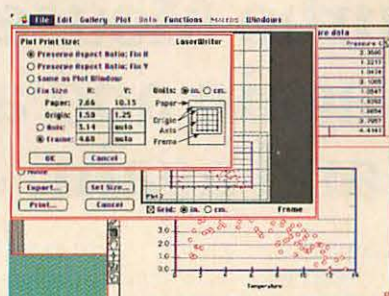
KaleidaGraph has some excellent but complicated options for importing data from text files. The complications arise from KaleidaGraph's flexibility. For instance, you can tell KaleidaGraph to read one header line as the data set title, skip a few lines in the header to get to the line containing the variable names, and then read only certain columns of data into the data set you're creating. You can experiment with the import options until you get the data you want without any frustration.

KaleidaGraph also offers good formatting options for both text and numeric data. The time format in-



Getting It All on Screen

Two datasets have been plotted in different windows. Spreadsheet views of both sets of data are in the upper-right corner. The sunspot plot is a regular scatter plot of six variables, while the other plot (unlabeled) is a probability plot of two variables from another data set.



Laying Out the Plots

This dialog box represents all the options for rescaling a plot on the page view prior to printing. One plot has already been sized and placed on the page (look to the lower right of the dialog box).

cludes m/d/yy, d-m-yy, h:mm:ss, and mm:ss.ss. KaleidaGraph also automatically converts fractions like $34\frac{5}{8}$ to 34.625 for plotting.

Give Me More Plots

Version 2.0 has removed the restriction of working with only one plot window at a time. Initially, only one plot appears, but you can display other plots by selecting names from a hierarchical menu. There's also a menu item to show all plots.

KaleidaGraph stores separate layout styles for each plot type; you can use different fonts and data symbols and put the legend in a different location for each type of plot.

KaleidaGraph especially shines by letting you manipulate the data in either the plot window or the data window. The data window's masking option allows you to select a specific range of data for plotting. When working in a plot window, you can use either the data-selection tool or the zoom-selection tool for changing plots. The data-selection tool lets you draw a polygon around part of a plot to define that data as the points of interest; KaleidaGraph then generates a new plot using only that data and recalculates any fitted lines for that data alone. The zoom-selection tool lets you select a rectangular region for a smaller-scale plot; KaleidaGraph doesn't recalculate fitted lines for zoom selections.

KaleidaGraph also provides a tool for identifying plotted points. After selecting the Identify icon from the tool palette, you can use the cursor to determine the x and y values of any plotted point. If you hold down the Option key after selecting a point, the program prints a label with the value of that point in a free area of the graph and draws an arrow from that label to the point (see "Getting It All on Screen").

Final Output

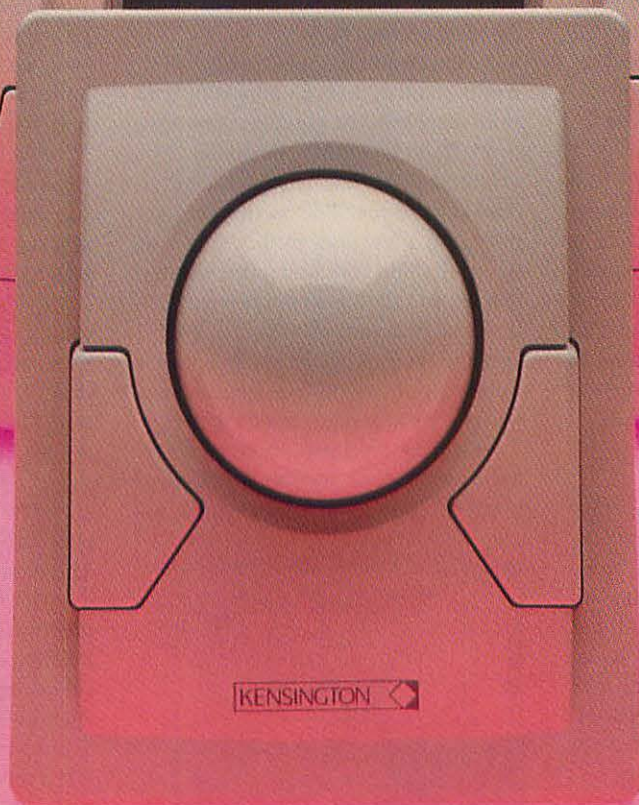
KaleidaGraph provides a page view for specifying sizes, locations, and aspect ratios of each plot. You can resize plots, maintaining either the length of one axis or the ratio of the two axes. Once you are satisfied with the layout, you can either print the page or save it as a PICT file, which is useful if you (continues)



**1987 Macworld
World Class Award**



**1988 Macworld
World Class Award**



**1989 Macworld
World Class Award**

Turbo Mouse. Wins again and again and again.

That's right. For the third year running, the readers of Macworld magazine have voted the Kensington Turbo Mouse®

"Best Input Device" for Macintosh® computers.

Who were the contenders? Every other trackball and mouse on the market. (Not to mention joysticks, keyboards and graphics tablets.) The winning secret? Simple.

Turbo Mouse is quicker, quieter, and easier to use. It delivers the winning combination of speed, precision, two buttons

with extra features, and a comfortable, space-saving design—all for just \$169.95.

For a free brochure, or a dealer near you, call (800) 535-4242. Outside the U.S. or in New York, call (212) 475-5200.



want to merge a plot layout into another document. You can also save individual plots as PICT or MacPaint files.

KaleidaGraph has taken steps to produce high-quality output on LaserWriters, especially when reproducing fine lines and small symbols. It has produced some of the best-looking graphs I've seen. KaleidaGraph has also added PostScript information to the comment section of the PICT files so that you can use the plots in other applications—like PageMaker and PowerPoint—that can read the PICT comments.

KaleidaGraph is easy to use even when importing data from other files. Its plotting speed makes it easy to fine-tune the appearance of a plot without frustration. I especially like the page layout and PICT-file options for printing and using plots with other programs. At only \$50 more than Cricket Graph, KaleidaGraph is a much better buy, both in terms of features and performance. The price advantage might not last long, however, as another plotting program, Igor, looks very competitive and costs less (\$195).

—Dave Kosiur

See Where to Buy or circle 780 on reader service card.

Network Sign-out Board

IN/OUT 1.0

Pros: Easy to use; user-defined shortcuts for posting new notes quickly; doesn't require file server. **Cons:** Workgroups limited to 48 users. **Company:** CE Software. **Requires:** Mac Plus; AppleTalk network; System 6.0.3. **List price:** 5-user pack \$199.95; 10-user pack \$299.95; 50-user pack \$999.95.



Do people pass in and out of your office as if it's Grand Central Station? Are you still trying to figure out where people are and what equipment is available? If so, you should be using In/Out, the first network sign-out board.

In/Out keeps track of people's schedules by letting networked users share a common database of appointments. You can also do such things as check on whether an overhead projector is available, or inform coworkers where you're likely to be for the

next few hours, but it only works when people use it consistently.

Setting Up In/Out

In/Out is designed to run in the background or on a Macintosh running AppleShare. You must be running System 6.0.3 or a later System version for In/Out to operate properly. Also, if you install In/Out on an AppleShare server, the server needs a minimum of 2 megabytes of RAM to work as a mail server or printer server or to handle more than 100 In/Out users.

In/Out allows you to define users, resources, and workgroups. You also have the flexibility of specifying a user's full name or using just first or last names. Workgroups can contain up to 48 names; if a workgroup gets larger, you'll need to divide it into two or more smaller groups.

In/Out is available in 5-, 10-, and 50-user packs; each pack has a serial number. When you're installing the In/Out server, the IOS Install program checks these serial numbers to prevent illegal duplication.

In/Out allows administrators to add or delete users and resources, create new workgroups, or change the In/Out server configuration.

Coming or Going?

Using In/Out is fairly easy. Like many other network programs, the first time you use it you have to select the network zone and the In/Out server that you want to log on to. The zone server is selected automatically after the initial setup. I encountered some long delays (one to two minutes) logging on with a Mac Plus to an In/Out server across a LocalTalk router; CE Software indicated that this is an abnormally long wait, but I have been unable to isolate the problem.

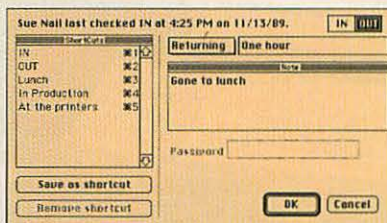
You can have In/Out automatically notify the server that you're "in" when you turn on the Mac and that you're "out" when you turn off the Mac. Other scheduling has to be done manually.

One nice touch is In/Out's screen saver. You can post a message that you are leaving, and it appears on your Mac as part of In/Out's screen saver; the message simply moves around a darkened screen.

CE Software/OverBoard/Control			
IN	OUT	IN	OUT
• Bascher, Gil	• Fatina, Tony	• Lind, Luke	• Skeels, Cindy
• Bracewell, J.	• Fante, Jolene	• Miller, Gloria	• Skeels, Dick
• Brown, Bob	• Hendricks, J.	• Miller, Paul	• Skene, Ron
• Brown, Dana	• Kirk, John	• Morgan, Fella	• Southern, D.
• Cavanaugh, S.	• Kirk, Peggy	• Nall, Sue	• Stoner, Steve
• Chrenen, Jr.	• Kirkendall, J.	• Koser, Larry	• Wilson, Kim
• Davis, Bill	• Knap, Jeff	• Reed, Dave	
• DeYoung, Le	• Lovern, De	• Reed, Bob	
• Edie, Piliwa	• Lovern, Pe	• Schum, Mark	

Keeping Track

In/Out's names-only view shows each user's name and whether he or she is in or out.



Out the Door in a Flash

The Shortcut dialog window includes a list of user-defined shortcuts for notes that can be generated with a 36-key combination. The notes "IN," "OUT," and "Lunch" are standard notes defined by In/Out; "In Production" and "At the printers" are defined by the users for their own standard messages.

The main purpose of In/Out is to inform coworkers of your presence or absence and to check who or what is available in the office. The tracking window, accessed using the In/Out desk accessory, displays full information or just names (see "Keeping Track"). For each user, the Full Information display includes name, return time, a note line, and the date and time that In/Out was last used. The Names Only display presents the names and status (In or Out) of all users in a multiple-column display. The program only displays one workgroup at a time.

In/Out's handy Shortcut dialog box lets you create your own often-used notes and assign them to 36-key combinations (see "Out the Door in a Flash"). Thereafter, you select the appropriate keyboard shortcuts and the note's entered.

I'm Outta Here

In/Out is a deceptively simple, but useful, network application that allows you to keep track of people and resources within a workgroup with a minimum of fuss.—Dave Kosiur

See Where to Buy or circle 777 on reader service card.

IF YOU LIKE WHAT THE MACINTOSH™ DID FOR PERSONAL COMPUTING



Now we have 3 easy-to-learn, easy-to-use accounting programs created especially for the Macintosh

MULTILEDGER™

An integrated accounting program which combines General Ledger, Accounts Payable, Accounts Receivable, and Inventory tracking. Generates checks, customer invoices, customer statements, and a wide variety of financial and management reports. Prints on ImageWriters, LaserWriters, and many other printers.

PAYROLL

A complete payroll system for organizations with 1 to 1000 employees. Use it as a stand-alone program or integrate it with either of our ledger programs. Calculates both employee and employer taxes and deductions. All state and federal tax tables and parameters are included and all can be modified by the user!

CASH LEDGER

An "entry-level" General Ledger program for those who don't need payables, receivables, or inventory tracking. Shares many of the same G/L features and advantages of MultiLedger, including check-writing, bank reconciliation, and financial reports. Upgradable to MultiLedger if more features are needed in the future.

COMMENTS FROM RECENT REVIEWS

"My favorite all-around accounting program is CheckMark Software's **MultiLedger / Payroll** set. It was the simplest and most logical I examined that provided a reasonably full set of capabilities. Its price/performance ratio represents an excellent bargain."

Macworld / September 1988

"**MultiLedger** is ideal for the small business. It's easy to set up and use and has an amazing set of accounting features when compared to other programs that cost more and don't offer much more power."

MACazine / March 1989

"I don't know of any other Mac accounting software which contains so many features and modules for the price."

Computers in Accounting / January 1989

"A welcome and impressive bonus is the **Payroll** program which can be linked to **MultiLedger**.... **MultiLedger** and **Payroll** are a bargain for companies that don't need a networked system."

MacUser / April 1989

"Our favorite package was **MultiLedger**.... it's the most elegant, usable and Mac-like of all the packages we reviewed.... CheckMark offers unlimited free telephone support to all users. This policy would lead to bankruptcy if the program were as confusing as others."

The Macintosh Buyer's Guide / Spring 1989

...YOU'LL LOVE WHAT WE DID FOR SMALL-BUSINESS ACCOUNTING

Easy. Powerful. If you thought they didn't go together, consider what the Macintosh did to redefine personal computing.

It let users concentrate on what they were trying to achieve or produce, while other systems forced them to focus on the operation of the computer itself. The amazing success of the Macintosh shows that when thinking people are given a choice between simplicity and power, they'll take both!

Those who created the Macintosh realized that it takes more time, more work, and more creative thinking to make something simple than it does to make something complicated. Their success has enabled us to create easy-to-use, affordable accounting programs for small and medium-sized businesses of all kinds.

To see if one or more of our programs can work for you, just give us a call. We'll send you a free demo disk of all three programs, reprints of recent reviews, and dealer names in your area.

You'll see for yourself just how easy and painless accounting on the Macintosh has become.

CHECK MARK
SOFTWARE INC.

1520 East Mulberry / Suite 200
Ft. Collins, Colorado 80524

Phone 303-484-3541 FAX 303-484-0429

Full-functioning demo disk available

1-800-444-9922

Dealer inquiries welcome


Macintosh, ImageWriter, and LaserWriter are trademarks of Apple Computer, Inc.
MultiLedger is a trademark of CheckMark Software, Inc.

★
Drawing and Visualization Package

STRATAVISION 3D 1.0.2

Pros: Clear user interface; excellent documentation. **Cons:** No surfacing tools; requires lots of memory when manipulating large drawings. **Company:** Strata.

Requires: Mac II; 2MB RAM; 20MB hard disk; System 6.0.3; 32-bit QuickDraw. 5MB on hard disk recommended. **List price:** \$495.

 After upgrading from my old 24-bit color board, I found the new ability to choose millions of colors from the monitor control panel device to be exciting, especially after I got a software package that makes use of 32-bit QuickDraw. It wasn't too long ago that complex photo-realistic imaging was available only to those who could afford a \$150,000 workstation. StrataVision 3D now brings complex imaging to the Macintosh at an affordable price.

Picture Perfect

StrataVision 3D begins with a pleasantly simple, yet powerful, user interface. Those familiar with Super 3D or MacDraw will notice many similar drawing tools such as polylines, circles, boxes, and text. You can create 3-D images using these tools, but StrataVision 3D includes tools for creating 3-D primitives such as spheres, cylinders, cones, and cubes, thus relieving you of the task of revolving and extruding a 2-D image.

Although there's a grid for accurate placement of objects, grid spacing units are in pixels and are not as accurate as I expected. StrataVision 3D lets you import images from just about any drawing package. You can import and render PICT and EPS files, but if the images you want to import have the slightest complexity, you'll probably have to import them in sections.

StrataVision 3D allows for both DXF and IGES translation. I imported AutoCAD Release 10 DXF files into StrataVision 3D and all the complex surfaces came through without a problem. StrataVision 3D recognizes the surfaces created in AutoCAD and can render them, but StrataVision 3D should incorporate its own complex

surfacing tools. Unfortunately, when I imported an IGES file from Schlumberger's MacBravo, many of the surfaces were not in the proper place and had to be deleted or moved. IGES translation problems are due to the lack of proper standardization rules and cannot be blamed on any one software package. A novice CAD user will find StrataVision 3D simple and easy to use. On the other hand, the program gives a trained expert the power to manipulate such intricate parameters as transparency, reflectivity, index of refraction, and so forth.

A 3-D model can have an infinite number of either spot lighting or diffuse lighting sources, each of which can be any color available in Apple's color wheel. You adjust light sources by dragging them around a sphere. Before you can render objects, surface attributes need to be assigned. When assigning attributes to the different objects, my favorite part is the texture mapping. Not only can you color an object and give it a shiny or transparent look, but StrataVision 3D makes surfaces come to life with a set of unique predefined attributes for plastic, wood, and metal.

After manipulating the position and the surface attributes of an object,

**Ray-traced images**

StrataVision 3D allows you to create many different surfaces. Reflective, transparent, and special marble surfaces interact with each other in these ray-traced images.

you use the camera tool to render. Multiple images can be batch-processed and rendered back to back. StrataVision 3D runs well under MultiFinder. I ray-traced a complex object in 32-bit mode while writing this article using the Mac with negligible slowdown. The slowdown becomes more apparent with complex images.

Track Performance

Although StrataVision 3D is relatively inexpensive, you have to make a substantial hardware investment to make use of all its wonderful features and be able to view the result. After finding out that 32-bit QuickDraw doesn't work on RasterOps' 24-bit ColorBoard 104, I broke down and paid \$2800 for the upgrade. For \$1000 you can get a board to use with a 13-inch monitor; a 19-inch monitor with a 32-bit color board costs between \$7000 and \$9000.

Though StrataVision 3D runs on a 2MB Mac, you won't be able to use MultiFinder or render and manipulate files quickly and painlessly. The more memory you have, and the faster your hard disk, the better. Even when I put the program on my slower optical disk, the optical disk was accessed through the System Folder on my hard disk. Be sure you have plenty of space on your hard disk for the cache file, since it can grow to be too big before the job is complete. Even on my 8MB Mac IIx, the cache file for a small image was 4MB while ray-tracing. You can view a file as it is being imaged, but there is a speed penalty for doing so.

Overall Image

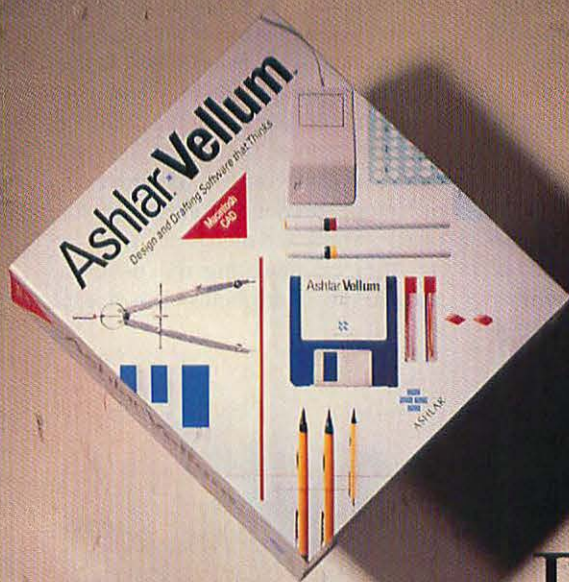
StrataVision 3D accomplishes many feats that less than a year ago were available only through Visual Information's Dimensions package. Although complex surface tools have been left out, you can import AutoCAD Release 10 images. Both complex surfaces and animation are being considered for future StrataVision 3D upgrades. Strata also has three attribute modules that contain decorative stone such as marble and granite; a military camouflage module; and a wood-grain module. If you have all the equipment to take advantage of it, this exceptional package is definitely worth the price.

—Victor Elgohary

See Where to Buy or circle 844 on reader service card.



CAD



RAD

Introducing software that thinks. There has never been personal computer design and drafting software this powerful, this fast or this intuitive. Vellum thinks. Its radical new technology automatically pinpoints and aligns geometry as you draw. Built-in intelligence allows you to draw virtually freehand, yet set precise dimensions at any time. Finally, the days of complex commands and weeks of training are gone. Vellum has made industrial-strength design click on the Macintosh. For a demonstration see your Ashlar dealer or call (408) 746-3900.



ASHLAR
Software That Thinks.

Circle 472 on reader service card

WINDOW SHOPPING

by Lawrence Stevens

This month I look at two tutorials: one for grammar, the other for darkroom work. I also review a utility for recovering deleted files and another for opening documents whose applications are not available.

Nuts & HyperBolts 2.0

Nuts & HyperBolts (\$189.95 from Sterling Swift Software) is a HyperCard-based grammar workbook. It provides lessons on parts of speech and parts of sentences, and lessons and practice sessions on agreement, sentence fragments, comma placement, and pronoun reference. The lessons are divided into small portions and displayed on a card. The grammar examples are humorous and interesting, and the explanatory text is clear, often witty, and sprinkled with encouraging phrases (see "Making the Right Choice").

The four practice stacks contain 20 cards each, with five practice sentences or fragments per card. You choose the card you want to work on by clicking on its title—for example, Frankenstein, The Marx Brothers, Quarterback. On each card, you must decide if the sentences or sentence fragments are grammatically correct. If incorrect, you specify—through



mouse clicks, not keystrokes—how to rectify the problem.

If you err on a practice question, Nuts & HyperBolts first displays a card that explains why your answer was wrong. Then the program takes you to the lesson section that covers that topic. You can choose to review the lesson or go back to practice.

Educational software has two potential advantages over its paper counterpart: it can branch into different topics based on a student's response, and it can be more attractive and fun to use. Nuts & HyperBolts excels wonderfully in the first category but falls somewhat short in the second. While the cartoon drawings are fun, there is no sound, and the only movement on each card is the blinking of the screen when a question is answered correctly. Unfortunately, since the scripts are inaccessible, HyperCard-savvy instructors won't be able to add their own frills.

The program is made tamper-proof by having all HyperCard menu and keyboard functions (as well as

the Apple menu) disabled. Users are dependent on on-screen buttons for navigation. These buttons work fine unless you inadvertently move to a wrong section. It would be nice to be able to use HyperCard's Previous command rather than using Nuts & HyperBolts' predetermined route.

I think the lack of control over movement within a stack and the inability to use DAs or to customize cards outweigh the advantage of protecting the stack from tinkering students.

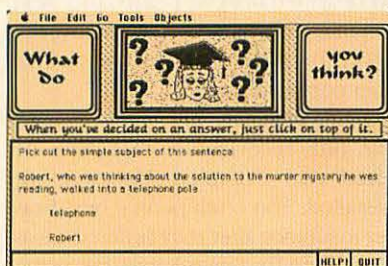
The problems notwithstanding, this is a fine example of computer-aided instruction. It's hard to conceive of a student completing the program without becoming adept in the subject matter.

MacPhotography Workshop 1.02

MacPhotography Workshop (bundled with MacInTheDark from Joseph Ciaglia Photography for \$79.50 plus \$3.50 shipping) is an ambitious, seven-disk, 4.5MB, non-HyperCard photography tutorial and darkroom assistant.

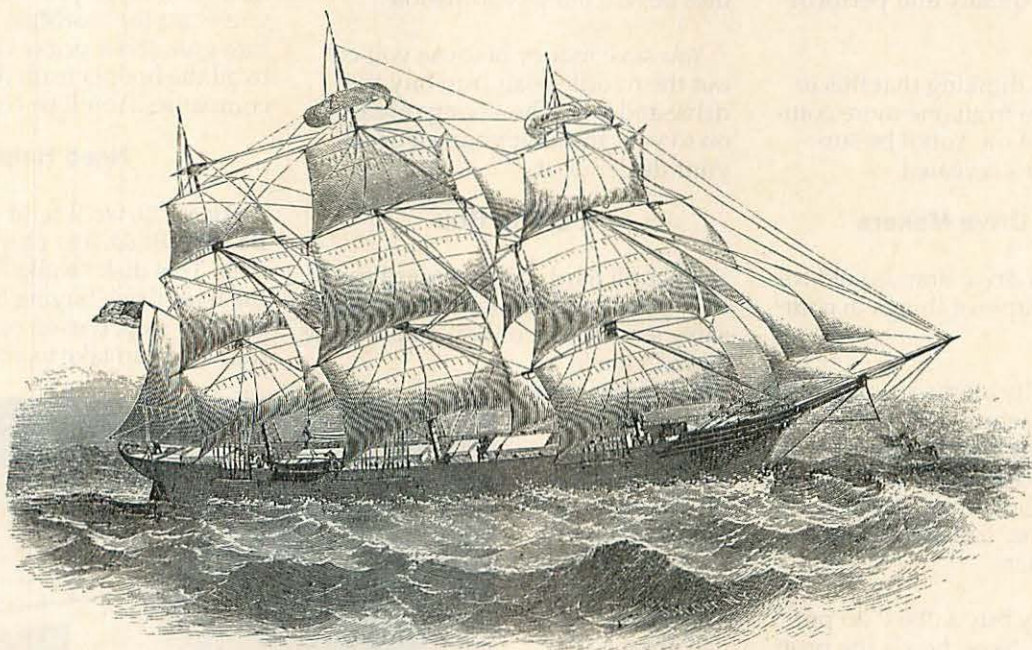
MacPhotography Workshop is a complete beginner's course in black-and-white camera and darkroom work. The camera section includes topics on lenses, film, light meters, and image control. The darkroom section includes everything you need to know to develop film. Each section begins with a text module that describes the processes in detail, delineates the equipment you need, offers some brand-name recommendations, and includes safety caveats.

The text sections are followed by interactive animated sequences. In some cases, the interactive sequences are relatively helpful. For example, you can click on various combinations of exposure times and paper grades to see how an on-screen image of a print is affected by them. It's less helpful (*continues*)



Making the Right Choice

While most Nuts & HyperBolts lesson cards expound a grammatical rule, a few offer multiple-choice questions. You select the answer by clicking on it. The selection you make determines the next card, which explains why you were right or wrong.



HOW DO YOU UPGRADE A CLASSIC?
FIND OUT ON APRIL 10TH.

MACDRAFT®

Circle 508 on reader service card

If you have to ask how much it costs, you're reading the right ad.

There are a lot of hard drives on the market. Each one claiming to be "unequivocally the best." And, most are proud how cheap they are.

All of us want a good deal. And in the next few minutes you'll learn how to truly get the best value without giving up quality and performance.

You may be thinking that this is just more hype from one more company. But, read on. You'll be surprised at what's revealed.

Hard Drive Makers

All the hard drive brands sold today have a couple of things in common.

First, virtually all these companies do not manufacture their own hard drive. They buy them from the real drive manufacturers. Companies like Seagate, Quantum, Rodime, CDC, Imprimis, Toshiba, Connors, and many others.

Second, they buy a "box" to put the drive into. Now, here's the problem.

A Short Economics Lesson

Each step of the way, these hard drive "makers" add a mark-up. Profit. Now, we'd be the last to say a company is not entitled to a profit. But here's how you get shafted.

When these companies buy a hard drive. They add a little profit. When they buy boxes. They add a little profit. When they buy cables. They add a little profit. The dealer add his profit. Pretty soon...well you get the picture. Right?

A Better Way

Here's the trade secret that will allow you to get the drive you want and save money too!

Universal MacProducts, Inc. is

the worldwide leader in one thing. Kits. We make more Macintosh hard drive kits than anyone else. There's a StorMate™ kit for internal installations or for external use.

With our kits, you can take virtually any SCSI hard drive and in minutes be Macintosh compatible.

You save money because you cut out the middle-man. You buy the drive and box. The savings are passed on to you. Install it yourself or let your dealer do it.

It's The Box

Since all hard drives, regardless of how you buy them, come from the same source. The only variable is the "box." Here's what comes standard with our StorMate kits. Cables, bracket or enclosure cabinet, StorWare™ software and manuals. And something we call **Total Satisfaction.**

- 1. Guaranteed Satisfaction.** When you purchase any StorMate kit, you have 30 days to change your mind. If for any reason you're dissatisfied with your purchase, just bring it back.
- 2. Box-to-Macintosh Warranty.** For a full two years, your StorMate kit is covered by the best warranty in the business. Should any part become defective, we will repair or replace absolutely without charge to you.
- 3. Optional Lifetime Warranty.** As a registered owner, you can purchase extended warranty coverage on

your purchase. In fact, for as long as you own the StorMate product we will repair or replace any defective part at no cost to you!

The Next Step

See your local Apple reseller. Tell him what drive you want and that you want the StorMate kit. Have him give you a price. Then compare to all the hoopla from those other companies. You'll be convinced.

Need Help?

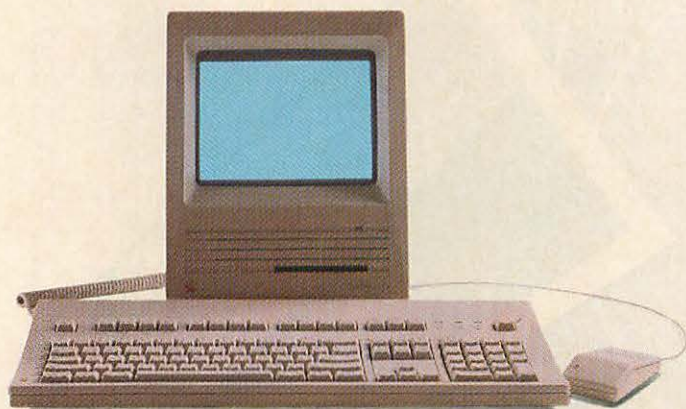
For \$7.00, we'll send you our **BYOM (Build Your Own Macintosh)** disk. This disk "walks" you through the hard drive buying business. Step-by-step. It even prints a quote that you can take to your local



dealer. And, of course we guarantee that it's more than worth the seven bucks. If you don't agree, we'll give you double your money back!

StorMate. From now on, you won't have to take it anymore.

Universal MacProducts, Inc.
23402 South Pointe
Laguna Hills, CA 92653-1512
Telephone (714) 581-3442



Don't Be A One-Mac Band.

The largest group of Mac® users in the world shares its problems and solutions online every day in CompuServe's Mac Forums. And you can join them.

Find out which Mac software lives up to its claims, which hard drive is best for your applications, how to use the new and exciting HyperCard.™ Get support from Mac software authors and hardware vendors.

Struggling with a complicated desktop publishing program? Ask someone who's been through it all. Can't make your word processing software work with

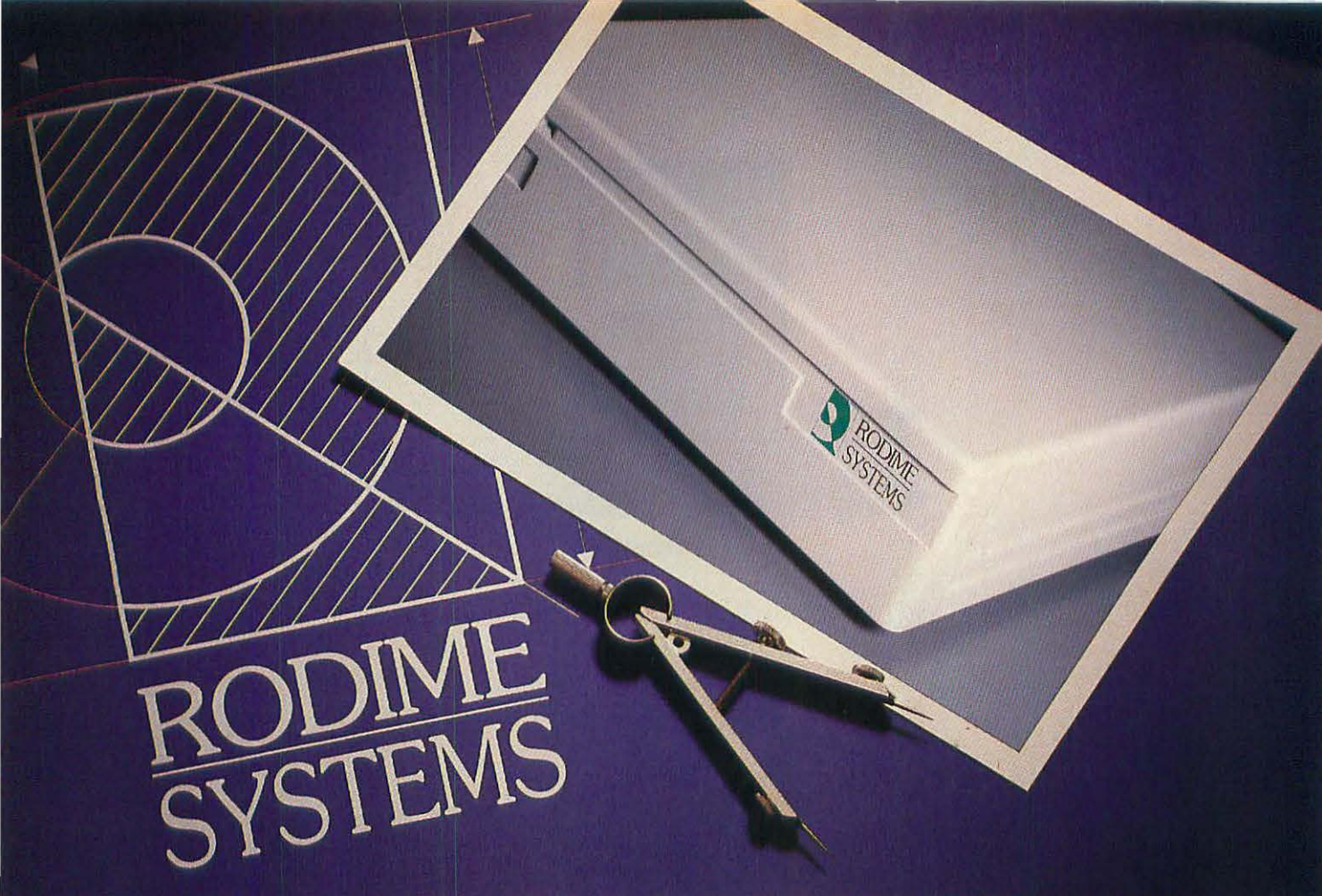
PixelPaint? Visit a CompuServe Mac Forum and get the answers. There's no better way to get more out of your Mac.

To join CompuServe, see your computer dealer. To order direct or for more information, call 800 848-8199. If you're already a member, type GO MACINTOSH at any ! prompt.

Circle 319 on reader service card

CompuServe®

COME VISIT OUR BOOTH AT THE MACWORLD IN MOSCONE CENTER, BOOTH 1925



RODIME
SYSTEMS

Rodime Introduces the Standard for Hard Disk Technology.

COBRA™ DRIVES SET THE STANDARD. Cobra™ high performance internal and external hard drives are the finest drives available for your Mac. With capacities of 45MB, 70MB, 100MB, and 210MB, Cobra is the answer to all your storage needs. External Cobra drives come in a new, sleek low profile cabinet that fits neatly beneath your Mac Plus, Mac SE or Mac SE/30. Internal Cobra drives come with three mounting brackets. One for installation in the Mac II, Mac IIx, Mac SE or Mac SE/30, one for mounting in the Mac IIcx and one for a Mac SE which allows you to keep both floppy ports active.

FAST 18ms ACCESS TIME. Nothing is faster! With an average access time of 18ms Cobra is the fastest drive available on the market for the Macintosh line of computers. Cobra drives also come with up to 48K Caching Buffer which allows even faster access to your data by storing frequently used data in "instant access" RAM.

CONVENIENT SINGLE POWER SOURCE. With the external Cobra, the flip of one switch on the drive activates your CPU, printer and other peripherals, eliminating cumbersome cables.

LED'S THAT PUT YOU IN CONTROL. Now you can be aware of the status of the drive at all times, with power-on, fault status indicator and drive activity lights.

ONE YEAR WARRANTY. Rodime Systems offers the level of reliability, innovation and support only an original equipment manufacturer can provide.

FREE BACK-UP AND UTILITY SOFTWARE. Cobra drives come with a FREE copy of FASTBACK™ back-up software as well as Rodime's Utility Software which allows partitioning (including A/UX), media verification, formatting and driver installation.

RODIME'S COMMITMENT TO QUALITY. At Rodime Systems, the craftsmanship built into every drive is our commitment to produce the finest, most reliable drives available. When you buy a Rodime Systems product, you are buying years of manufacturing experience, state of the art engineering and peace of mind that comes from knowing that more Mac users have chosen Rodime drives than any other.

Rodime Systems 901 Broken Sound Pkwy.
Boca Raton, FL 33487 407-994-5585
UK, Nasmyth Rd., Southfield Industrial Estates
Glenrothes, KY6 2SD, Fife, Scotland 592-774-704
France, Parc d'Affaires de Jouy-en-Josas
5bis Rue du Petit Robinson, 78350 Jouy-en-Josas, 1-34-659798

Fastback is a trademark of Fifth Generation Systems, Inc.
Macintosh, Mac Plus, Mac SE, Mac SE/30, Mac II, Mac IIx, Mac IIcx and A/UX are trademarks of
Apple Computer, Inc., Cobra is a trademark of Rodime Systems.



NEW PRODUCTS

Edited by Mary Margaret Lewis

This section covers Macintosh products formally announced but not yet evaluated by Macworld. All prices are suggested retail. Please call vendors for information on availability.

HARDWARE

2400XF Modem

Menu-driven fax modem that can send to any Group II facsimile machine. Can be programmed to send one or several pages from a document containing text or graphics at predetermined times to multiple fax numbers. Measures 5 1/2 x 4 1/4 x 1 1/2 inches. Micro Electronic Technologies, 508/435-9057.

Chinon DS-2000 and DS-3000 Macintosh Scanners

Desktop scanner with SCSI power adapter and cable, utility software, scanner cable, and AC adapter. 200 dpi version \$695. 300 dpi version \$895. Chinon, 213/533-0274.



Colormate PS

Colormate PS

Color PostScript printer with 8MB of RAM and a Motorola 68020-based Adobe PostScript interpreter that provides 35 resident fonts. \$9995. NEC, 415/961-4400.

ColorSnap-32

Color capture board that captures 24-bit images from the Canon Xap Shot and other Canon still video cameras, as well as from other NTSC composite video sources such as video cameras, video recorders, and monitors. \$1595. Computer Friends, 503/626-2291.



DataVault

DataVault

A 4mm, 1.3GB tape drive that supports the digital data storage (DDS) format. Has ten times the search speed of an 8mm tape, and stores data at 11MB per minute. \$4995. Tecmar, 216/349-0600.

Ether2

NuBus board for the Macintosh II family that supports both thick- and thin-wire

Ethernet and comes with management software. \$395. Compatible Systems, 303/444-9532.



GridMaster

GridMaster

Digitizer tablet designed as a flexible mat that may be rolled up like a poster. Can be used with all graphics applications. Has a resolution of 1000 lines per inch. Includes side-switch pen stylus or four-button mouse. Weighs 4 ounces. With four-button mouse \$469, with stylus \$449. Numonics, 215/362-2766.



Kodak Diconix M150

Kodak Diconix M150

Portable ink-jet printer designed to fit in a briefcase or the Macintosh Portable carrying case with the Mac Portable. Produces letter-quality output on plain paper. Is Adobe-type-font compatible and battery operated. \$699. Kodak, 800/255-3434.

LaserBank 600 R

Rewritable optical-disk sys-

tem for the Macintosh that uses 600MB laser disks for data storage and retrieval. System includes backup and archival backup utility that enables you to back up entire contents of disk or specific files only. \$6995. Micro Design International, 407/677-8333.



LFR Plus

LFR Plus

Desktop film recorder that provides color sweeps to images that have finely shaded backgrounds and sharp detail. Produces more than 30 slides per hour. \$13,750. Lasergraphics, 714/727-2651.



MacPoint

MacPoint

Alternative input device for the Macintosh Portable that performs function of keyboard and numeric keypad. Can be used with a stylus or a finger. Snaps into the keypad of the Mac Portable. \$299. Interlink Electronics, 805/684-2100.

(continues)

Nanao FlexScan Model 9400

Monitor that supports 24-bit color. Capable of resolutions up to 1024 by 768 on a Macintosh II when used with graphics boards such as Radius's Direct-Color/24 or RasterOps' ColorBoard 108. \$3799. Nanao USA, 213/325-5202.

**Nanao FlexScan Model 9400****QuickCAD**

Graphics display system for Mac II family that consists of single-slot, plug-in NuBus board and proprietary software. Uses VLSI technology

and is capable of computing six million instructions per second. \$1495. Radius, 408/434-1010.

**The Remote Mouse****The Remote Mouse**

Hand-held remote-control input device installed on the ADB port of the Mac. Bundled software utility provides mouse control and labeled keypad enables you to point, click, drag, and select. \$395. Forte Communications, 408/733-5100.

RGB VideoLink 600AX

Scan converter for transforming computer graphics to video for the Mac II. \$11,995. VGA and Mac II

**RGB VideoLink 600AX**

cables \$135. RGB Spectrum, 415/848-0180.

Silentwriter2 290

An 8-ppm, 300-dpi PostScript laser printer. Includes 2MB of RAM and is expandable to 4MB. Contains built-in controller comprising 16.7 MHz M68000 CPU, Adobe PostScript interpreter, and 35 resident scalable typefaces. \$4495. Adobe, 415/961-4400.

Smartmodem 2400M

Internal modem for the Mac II family that incorporates CCITT V.42 bis, V.42, and X.32 standards. Provides point-to-point error-control

throughput to 9600 bps, and connections to packet-switched networks. \$699. Hayes, 404/449-8791.

**Super Digitizer 510C Tablet****Super Digitizer 510C Tablet**

Pressure-sensitive, cordless digitizing tablet that can be used with pressure-sensitive stylus pen. Has 6-by-9-inch reading and drawing surface and weighs 1.9 pounds. \$495 including stylus. Wacom, 201/265-4226.

ViewFrame RGB

Color LCD-projection panel that allows you to project computer-generated presentations in color with a


With the HP DeskWriter, you can

The Paradise Times

VOL. III SPRING, 1990 WANDERING TOURS LTD.

For the traveler craving the tropical essence of the Yucatan as well as a dash of the good life, Akumal is the place. It's not the luxury class of Cancun, but it beats the pants off most other small resorts along the coast.

Akumal prides herself on the conspicuous absence of telephones, TVs or bustling activity.



Folks, this town is laid back. It offers a good selection of hotels, dining and activities to soothe frazzled city nerves.

A large barrier reef runs parallel to the Quintana Roo coast, protecting the lagoon from the open sea. Basically it creates a gigantic underwater playground, chock-full of Caribbean underwater goodies which attract divers from all over the world.

For the archaeology buffs out there, Akumal is 15 km from Tulum. For the rest of us that means it's close to one of the few walled Mayan ruins. Xelha is another 5 km, and even the ambitious among us will want to slip into masks, snorkels and fins to check out this natural underwater aquarium.


In Mayan lingo, Akumal means "Place of the Turtle" not because it's so laid back, but because giant green turtles have come ashore since the dinosaur days to lay their eggs in the warm sands of the Caribbean.

Surrounding Akumal are lush jungles and thick coconut groves. Bright red bromeliads bloom high in the trees during early spring sustaining themselves on rain, dew and humidity. While checking out bromeliads, you will probably see its cousin, the orchid.

Along the porous sand of the Akumal beaches, you'll find lots of really neat stuff: conch shells, lacy red seaweed, coconuts sprouted after soaking in the sea for months, and crabs of all sizes and colors.

This month's featured destination:

Akumal



Relax amidst the long stretches of wind bent coconut trees which set off the blazing white sands of Akumal's sweeping beaches.

transmissive overhead projector. Allows simultaneous viewing of local monitor and projected image. \$3995. nView Corporation, 804/873-1354.

SOFTWARE

Auto-Architect

Software to be used with Auto-CAD for architects, architectural engineers, facility managers, space planners, and construction professionals. Provides tools for design, input, and editing in plan, elevation, and 3-D. 5MB min. memory. \$1995. D.C.A. Engineering Software, 603/428-3199.

Bird Brain

Expandable database designed to help bird-watchers keep track of their sightings. Contains reference database of common and scientific names and taxo-

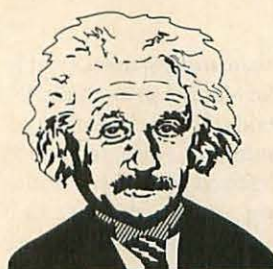
nomic order of North American birds. Also contains page references for each bird in major field guides. 1MB min. memory. \$125. Ideaform, 515/472-7256.

Blackjack Tutor

Program for creating, testing, and teaching blackjack gambling strategies. Show Stats feature helps you determine success of various blackjack strategies. Uses running card counts and makes suggestions for bets. 512KE min. memory. \$24.95 plus \$2.50 s/h. Post Meridian Software, 612/733-7697.

Clipables

Collection of PostScript clip art, 17 disks containing more than 600 illustrations in such categories as sports, humor, holidays, animals, and maps. Compatible with any program that accepts



Clipables

EPS graphics. 1MB min. memory. \$149.95. C.A.R., 314/721-6305.

Cost Management System

Project-management software with features for cost estimating, job costing, cost variance reporting, and general ledger file export. Has more than 20 management reports. 1MB min. memory. \$495. Softouch Software, 503/241-1841.

Docket Time

Software for law offices that enables you to calculate legal deadlines, create

docket slips, and print docket calendars for each lawyer working in a firm. Program automatically accounts for weekends, legal holidays, and service by mail. 1MB min. memory. \$249. Professional Software Designs, 602/841-4220.

Flash

Mac-to-Mac information-exchange software that operates in the background on Macintosh network. Groups data being sent or received into folders. Compatible with MultiFinder. 1MB min. memory. \$199.95. Beagle Bros., 619/452-5500.

FlexiGraphs

Software that uses graphs as interactive devices for the input and manipulation of numerical data. Derives numeric values from line, bar, or pie charts drawn (continues)

have it all. (But keep it to yourself.)



The HP DeskWriter printer puts laser-quality printing right at your fingertips.

With a small size and a \$1,195* price tag, the DeskWriter printer easily fits on your desk and in your budget. And its advanced 300 dpi inkjet technology lets you print sparkling text and detailed graphics.

The DeskWriter is also designed for easy use with your Macintosh, and even includes scalable and outline fonts. Combine that with the DeskWriter's whisper-quiet operation, and keeping it to yourself will be that much easier. So call 1-800-752-0900, Ext. 1004 for your authorized HP dealer.

There is a better way.

Circle 343 on reader service card

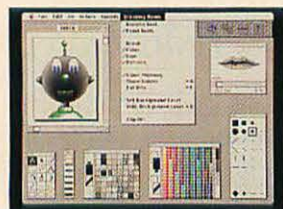


**HEWLETT
PACKARD**

freehand by user. 1MB min. memory. \$179. Tree Star, 805/682-4096.

How To Use Microsoft Word, Macintosh Version 4

Self-paced audiotape and software course that teaches user to create, edit, merge, and print documents created in Microsoft Word. Also explains changes in Word's menus, spelling checker, and indexing structure. 1MB min. memory. \$99. FlipTrack Learning Systems, 312/790-1117.



interFACE

interFACE

Software that lets the user

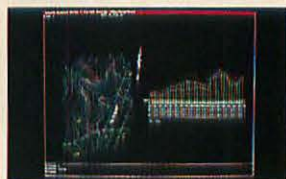
create *talking agents* within the Macintosh interface. Extends the concept of HyperAnimator with improved digitized-sound-synchronizing utility, compressed sound capabilities that are compatible with Farallon's MacRecorder, and speed improvements. Has import-export facilities and imports color into HyperCard. 2MB min. memory. \$499.95. Bright Star Technology, 206/451-3697.

LetterWorks

Disk-and-book package containing 400 sample business letters. Documents are in ASCII text format and are compatible with most major Mac word processors. Letters are annotated with suggestions for appropriate use. 1MB min. memory. \$79.95 plus \$4.95 s/h. Round Lake Publishing, 203/438-5255.

Mac CGM Converter

Software converts ANSI or ISO graphic files created on an IBM PC or compatible, PS/2, workstation, mainframe, or minicomputer to Mac PICT or PICT2 format. 512K min. memory. \$150. Pixelix, P.O. Box 158, Cohuna, VC, 3568 Australia.



MacCivil

MacCivil

Civil-engineering and site-design program that operates inside AutoCAD. Provides range of coordinate-geometry, topographic, and civil-engineering design applications that address all aspects of site development. 5MB min. memory. \$1995.

D.C.A. Engineering Software, 603/428-3199.

Mail Rater

HyperCard reference program that includes database containing 600 United States Postal Service zone charts; rate regulations for first class, priority, third class, fourth class, and express mail; and information on special services such as return receipt and insurance. 1MB min. memory. \$49.95. Tight Line Software, 714/367-0007.

MindLink

Problem-solving software helps you link ideas and brainstorm within a problem-solving environment. 1MB min. memory. \$499. MindLink, 802/457-2025.

Moby Hyphenator

Software listing over 150,000 English words with

With the HP ScanJet Plus, you've

The HP ScanJet Plus scanner provides 8-bit photographic-quality scanning.

That means 256 shades of gray for the hottest-looking output from your Mac. And it's so easy, too. At the click of a mouse, you can get negative or mirror images, as well as scaling in 1% increments from 4-200%. All for \$2,190*, about what you would expect to pay for a 4-bit scanner.

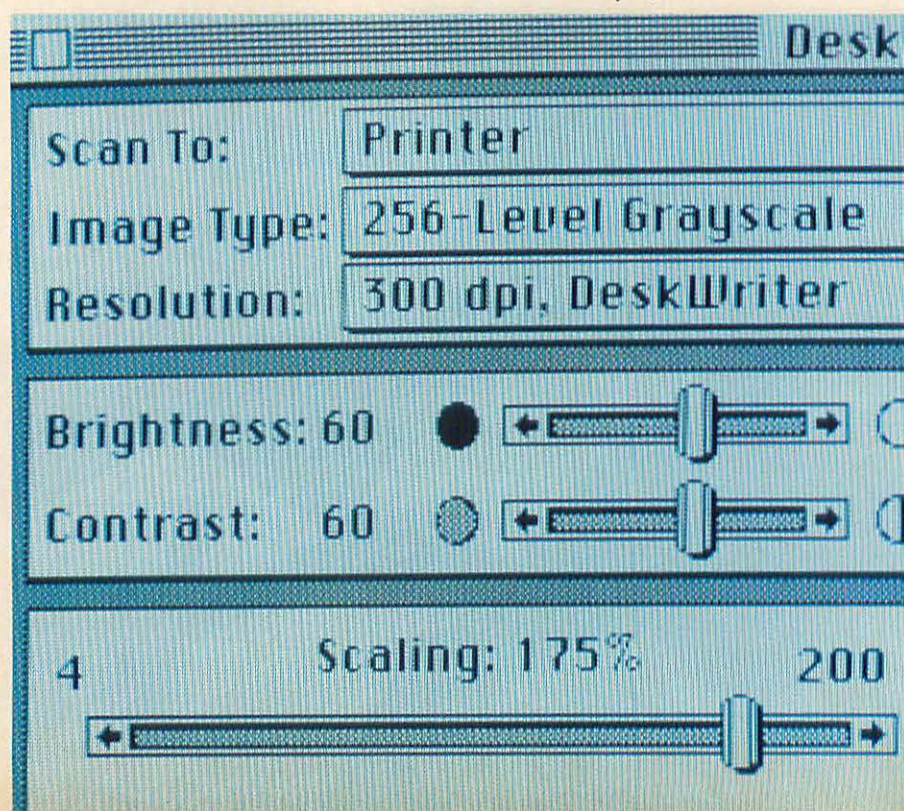
So if you want the richest, most detailed images from your Mac, you've got it made with Hewlett-Packard. Call 1-800-752-0900, Ext. 1005 for your authorized HP dealer.

There is a better way.



**HEWLETT
PACKARD**

Circle 344 on reader service card



hyphenation and syllabification. 1MB min. memory. \$129. Illumind Unabridged, 408/373-1491.

Pipe Dream

Spatial strategy game in which you build the longest possible continuous pipeline (from various shapes of pipe), while racing against a moving stream of chemical fluid called flooz. 1MB min. memory. \$39.95. LucasFilm Games, 415/662-1966.



The Playroom

The Playroom

Program built around the theme of child's playroom filled with games, toys, and

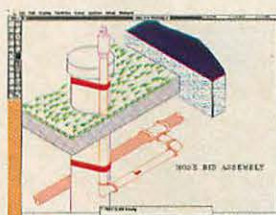
surprises. Includes seven games that introduce children to essential skills, including early math, reading readiness, telling time, beginning typing, art, creativity, and logical thinking skills. 1MB min. memory. \$119.95. Brøderbund Software, 415/492-3299.

PosterWorks

Poster-production software that prints color images up to 100 square feet on any PostScript device. Program creates halftones, color prints, or color separations. 1MB min. memory. \$167. S.H. Pierce & Company, 617/395-8350.

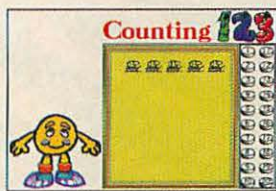
Precision

CADD package in 2 1/2-D that combines CAD and drawing features. Includes global symbols, built-in IGES and DXF translators. Variable text feature lets you define



Precision

a symbol according to its context. Supports PICT file format. 2MB min. memory. \$295. Innovative Systems, 413/737-3993.



Preschool Pack

Preschool Pack

Software teaches children the alphabet and numbers using color, animation, and graphics. Lessons include AlphaWorks; Bar Math;

Concentration; Connect the Dots; Counting 1,2,3; and ShapeWorks. 1MB min. memory. \$69.65. Nordic Software, 402/466-6502.

PS View

PostScript compatible programming and imaging environment that enables you to view PostScript graphics files on screen before printing. 1MB min. memory. \$499. ImageSoft, 516/767-2233.

QuickLock

Security software that password-protects desktop access, provides F-key access, and includes a time-out locking mechanism. Remains active when the machine is restarted and acts as a screen saver. 1MB min. memory. \$99.95. Kent Marsh Ltd., 713/623-8618, 800/325-3587. (continues)

got it made in the shades.





The First Color/Gray-Scale Scanner For Under \$2700!



Microtek presents the MSF-300Z. The one scanner that can do it all: color, gray-scale, drawings and text. All for a price that until now, could barely buy you gray-scale capabilities.

Hard to believe, but it's true. You can scan vivid color images into your computer for desktop publishing, presentation graphics or pre-press work. A full 16.8 million colors at a time.

If you don't have a color application yet, this unique scanner captures gray-scale as well as black and white. So you can start working today.

Images can be scanned in 256 gray-scale mode and then retouched, scaled or rotated. And printed on a laser printer or phototypesetter with outstanding results.

Charts and drawings are quickly scanned in single bit-per-

pixel mode then imported into your favorite publishing or word processing program. You can even bring words into your computer without retyping by adding OCR software.

The Microtek Color/Gray scanner also comes with sophisticated color, gray-scale and black and white image editing software. Making it an even more outstanding value.

If you need a scanner for your IBM PC, PS/2, or Macintosh, you need Microtek's MSF-300Z Color/Gray scanner. Call (800) 654-4160 or in California (213) 321-2121 today to find your nearest Microtek dealer. After all, at this price, you can hardly afford not to.



The MSF-300Z Color/Gray scanner is just one member of a whole family of innovative scanners available from Microtek.



★★★★★
FIVE STAR AWARD
Publish! 1990



MICROTEK
Better Images Through Innovation.

•Microtek Lab, Inc., 680 Knox Street, Torrance, CA 90502, (213) 321-2121 (800) 654-4160 •Microtek International Inc., No. 6 Industry East Road 3, Science-Based Industrial Park, Hsinchu Taiwan 30077, R.O.C., 886-35-772155
•Microtek Electronics Europe, GmbH, Grafenberger Allee 277, Stapelmann-Haus, 4000 Düsseldorf 1, F.R. Germany, 49-211-6790051 • © 1989 Microtek Lab, Inc. All rights reserved. Macintosh is a trademark of Apple Computer, Inc. IBM, XT, AT and PS/2 are trademarks of International Business Machines Corporation. All other trademarks or registered trademarks are the property of their respective holders.

Circle 427 on reader service card



Best Performer!



FoxBASE+ /Mac: The Most Celebrated Mac DBMS Now Includes a Powerful Report Writer!

**New
Version 2.00!**

New FoxBASE+ /Mac Version 2.00 is here—and stealing the show! In its first year, FoxBASE+ /Mac won more awards—both in the U.S. and Europe—than any other DBMS ever created for the Macintosh! And Version 2.00 is faster and more powerful than ever—packed with innovative new features and language enhancements!

New FoxReport!

FoxReport lets you create virtually any columnar or free-form report—without *any* programming! FoxReport includes:

- **Page Layout:** Designate many layout settings for your report: number of columns, left margin setting, column width, space between columns, measurement size for each page, and more!
- **Report Layout Window:** Define the different areas within your report, using FoxReport's new "band" system. Start with the default bands: Page Header, Body, and Page

Footer, then bring in other bands like Title, Summary, Column Headers and Footers, etc.

- **Object Menu:** Control the Type Font, Sizes and Styles of text objects. Fill and Pen options let you change the color and shading of almost every object!

- **Page Preview:** "What-You-See-Is-What-You-Get" design ensures that the report on your screen is *exactly* as it will appear in print!

- **Label Generator:** Create labels of almost any size and configuration. You can even include pictures *anywhere* on the label space!

New Features!

- **Enhanced XCMD/XFCN Support:** Load up to 16 external XCMD's and XFCN's, then access them directly from within FoxBASE+ /Mac 2.00 programs!
- **Language Enhancements:** Other features include: support for custom hierarchical menus, new commands to help handle resources, new system functions to improve filename and screen management, and much more!

Perfect Connectivity!

FoxBASE+ /Mac 2.00's Multi-User version allows complete data and application sharing between networked Macs and PCs! (when used with FoxBASE+ /LAN). It also runs on the most popular network systems: AppleShare, Novell and 3Com! . . . *And It's Faster Than Ever!*

Order or Upgrade Now!

FoxBASE+ /Mac Version 2.00 is the *new* Leader of the Mac! And at only \$495 (\$695 for Multi-User), it's a phenomenal bargain! If you're already a FoxBASE+ /Mac registered user, you can upgrade to Version 2.00 for just \$75!

To order your copy (or ask for a *FREE* demo disk), call (419) 874-0162. Or visit your local quality software dealer.

After all, when it comes to the Macintosh, *Nothing Runs Like a Fox!*

FoxBASE, FoxBASE+ /Mac, and FoxReport are trademarks of Fox Software. Macintosh is a trademark of Apple Computer, Inc.

Fox Software

Fox Software, Inc. (419) 874-0162, Ext. 650
134 W. South Boundary Fax: (419) 874-8678
Perrysburg, OH 43551 Telex: 6503040827 Fox

Circle 152 on reader service card

**Research Assistant**

Software designed to teach students how to use a library effectively. Program divides the research process into a series of steps from initial stages of research to recording citations. 1MB min. memory. \$150. Upper Broadway Bodega, 203/647-8104.

Sands of Fire

World War II tank simulation that is designed to re-create the atmosphere of a small tank unit engaged in warfare in the North African desert. User can fight battles as either a British or American commander in any of six different theaters. 1MB min. memory. \$49.94. Electronic Arts, 415/571-7171, ext. 379.

SecureInit

Program that lets you set a password to start a hard

disk; enables you to lock application and System files, enables you to refresh System files. Also lets you hide System Folder, lock disk after use, verify all or selected applications, close all windows at start-up; lets you protect hard disks from being launched by invalid user name. Has automatic file purge, erases empty folders, ejects System disks, and protects configuration with a password. 512K min. memory. \$99.95; educational and site license discount available. Direct Software, 415/347-1590.

Space Rogue

Space-flight simulation game that takes place in a universe of three-dimensional outposts, mining stations, planets, asteroids, stars, and starships. Players get to execute loops, rolls, and spins, and experience

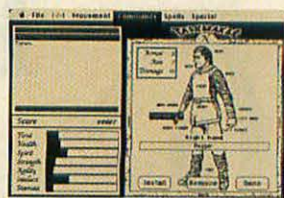
the tug of gravity while moving past stars. 512KE min. memory. \$49.95. Origin, 603/644-3360.



StrataVision Surface Attribute Libraries

StrataVision Surface Attribute Libraries

A series of three surface-attributed libraries that is designed for use with StrataVision three-dimensional rendering package. Predefined images are photo-realistic and come in decorative stone, military camouflage, and wood grain. Surface images are 32-bit color. 2MB min. memory. \$139 per library. Strata, 801/628-5218.



TaskMaker

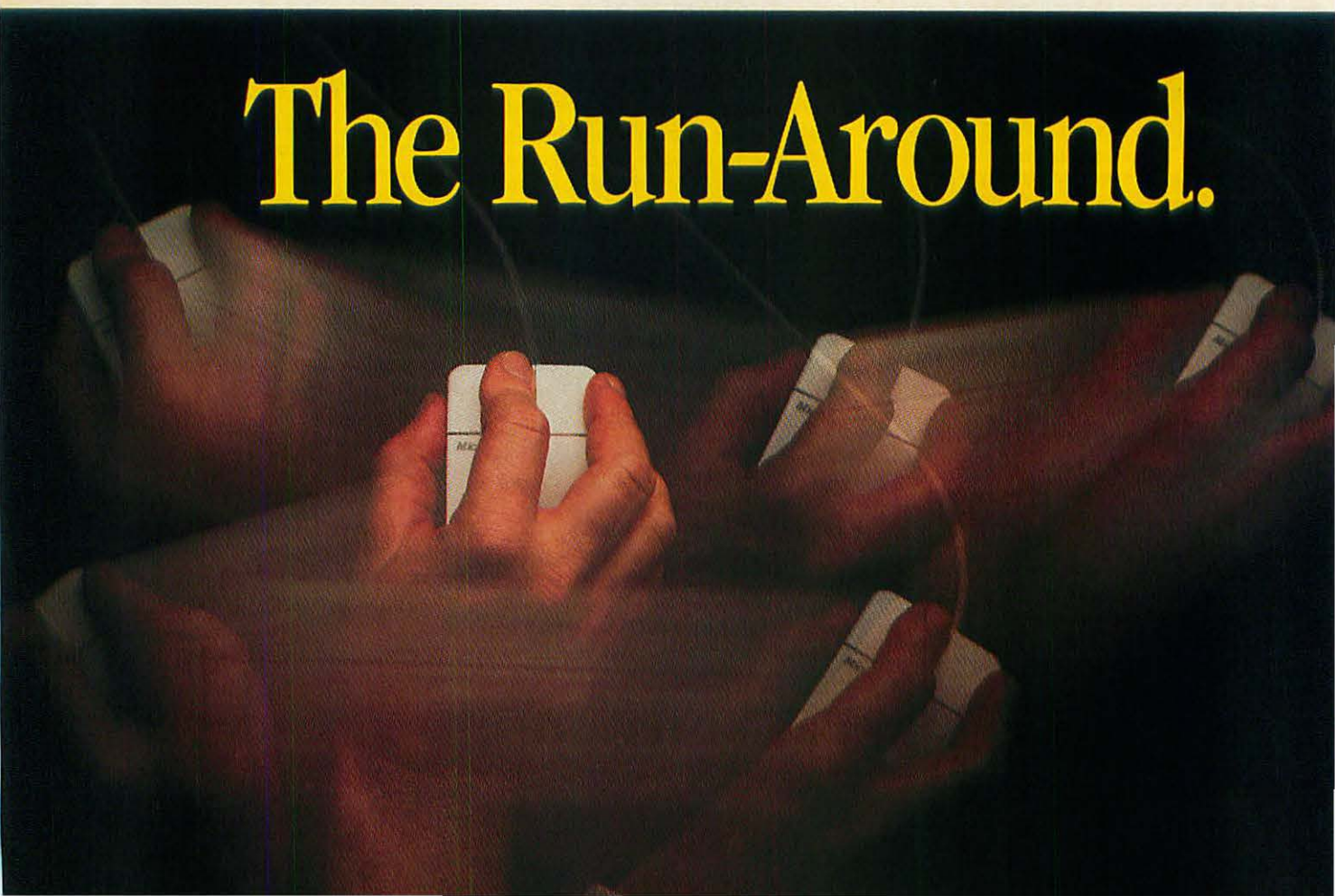
TaskMaker

The goal in this graphic adventure game is to complete ten tasks assigned by TaskMaker to restore order and prosperity to a devastated kingdom. In the process user fights monsters, searches out trap doors and dark pits, discovers jewels, and explores secret passages. 1MB min. memory. \$49.95. Xor, 612/831-0444.

Ticklers

Game composed of 30 original limericks, each of which has been formed into a puzzle. Player's challenge is to put together informa-

The Run-Around.



tion gathered from clues in order to solve the puzzle and discover the limerick. Graphical menu. 512K min. memory. \$34.95. MBI Software, 213/479-6790.

ACCESSORIES

12-Volt DC Power Adapter

Power adapter for the Mac Portable that charges internal battery from any 12-volt DC power source, such as an automobile or boat. \$69.95. Lind Electronic Design, 612/927-6303.



External Battery Charger

External Battery Charger

Battery charger for the Mac Portable that will also

charge any 12-volt DC power source or the spare battery of an automobile. \$99.95. Lind Electronic Design, 612/927-6303.



Macnifier

Macnifier

Magnifying screen with glare protection. Has adjustable magnification of up to 130 percent, making a 10-point font appear to be 14 points, for instance. \$129.95. Premtech, 404/662-1533, 800/445-5737.

BOOKS & VIDEOS

The Complete Directory of Public Domain and Shareware Software for the Apple Macintosh


Directory with more than 10,000 different titles for Macintosh public domain software and shareware. Titles described in directory are available from Budgetbytes for \$5.99 per disk. \$2. Budgetbytes, 913/266-2200, 800/356-3551.

Macintosh Hypermedia

Reference guide that is dedicated to Hypermedia on the Macintosh. Includes history and underlying concepts of hypermedia, its uses and applications, and its social implications, including issues that involve privacy, copyright, private versus public publishing, and intellectual property. \$17.97. Scott Foresman Mac-

intosh Computer Books, 708/729-3000.

The Ventura Publisher Solutions Book: Recipes for Advanced Results

Step-by-step guide for intermediate and advanced Ventura Publisher users takes a cookbook approach by providing solutions and tips in recipe format. Covers Ventura Publisher 2.0 and Professional Extension. \$24.95. International Typeface Collection, 212/371-0699. 

To have your product considered for inclusion in New Products, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, phone number (and two copies of software) to New Products Editor, Macworld, 501 Second St., San Francisco, CA 94107. We reserve the right to edit submissions.

To The Point.



Introducing the UnMouse™

	Absolute Control	Function Keys	High Accuracy	Tracks	Draws	Spreads	Key Mapping	Key Mapping	Key Mapping	Key Mapping
Mouse										
Trackball										
UnMouse										

Quit mousing around and get to the point with The UnMouse. It does everything a mouse can – only faster and in less space. To move the cursor, simply touch the glass. To make a selection, merely press.

Mice run off their pads. Hog your desk. And have to be found, oriented and dragged. But The UnMouse is always stationary. And always faster. With its Absolute mode, one million touch points map exactly to the screen. Just touch a point and instantly the cursor goes to the same location.

Plus The UnMouse has additional features a mouse can't touch. Its Power KeyPad provides up to 60 function keys and macros per application. And with its drawing stylus, it even serves as a small, yet powerful graphics tablet. For more information and your nearest dealer:

CALL 1-800-UNMOUSE.

MicroTouch

Dealers circle 426 on reader service card
End Users circle 449 on reader service card

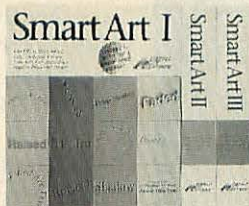
55 Jonspin Road /Wilmington, MA 01887
508 694 9900 /FAX 508 694 9980

The less time you spend creating effects like these, the better.

Now you can add new zip to any document — or try out special effects in a flash — with Smart Art.[™] Each volume in the Smart Art library contains fifteen effects, so your text can cast a long shadow or wrap around a circle in seconds. Smart Art effects save a lot of time because they're ready to use in virtually any application. Yet it's easy to customize these pre-built libraries of graphic and type effects by changing the font, size, shading and much more.

How does it work? Smart Art is a desk accessory that cleverly uses the PostScript[®] in your laser printer to create special text, 2D and 3D

effects on your Macintosh[®] screen. Once you're satisfied with the effect you've made, paste it into your drawing, word processing or desktop publishing program and output it with any Adobe[®] PostScript printer or other device. Of course, Smart Art works with any PostScript font, too.



The less money you spend creating effects like these, the better, too. That's why Smart Art's suggested retail price is only \$149.95 a volume. New volumes are also available, so if you don't see the effect you need, call Emerald City Software at 1-800-223-0417, in CA 415-324-8080.

Slanted

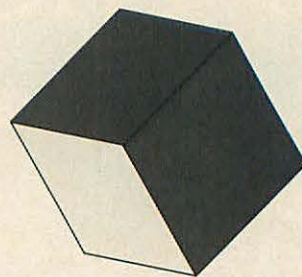
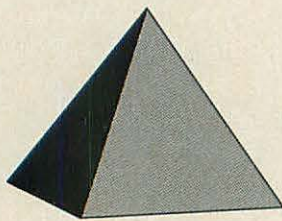
Half Circle Text

Angled

Raised

Drop Shadow

BANDED



Neon

Faded

Split Reverse



Smart Art is a trademark and Emerald City Software is a registered trademark of Emerald City Software. Adobe and PostScript are registered trademarks of Adobe Systems Incorporated. Macintosh is a registered trademark of Apple Computer, Inc. © 1990 Emerald City Software. All rights reserved.

Dealers circle 18 on reader service card

End users circle 212 on reader service card

Quick Tips

BEST IMAGEWRITER QUALITY, KEYBOARD-CONNECTOR LIFE, QUITTING THE FINDER, AND MORE

H

BY LON POOLE

ow do you feel when you insert a floppy disk containing a week's work and the Mac responds with "This is not a Macintosh disk: Do you want to initialize it?" A little tight in the pit of your stomach? Disks do wear out and drives drift out of

alignment, as I explained last December. Russell K. Hobbie of Saint Paul, Minnesota, can sometimes get a marginal disk to work by reinserting it several times or by trying a different drive. He's also successfully fixed flaky floppies using Apple's Disk First Aid utility software. Disk First Aid will show its normally hidden activity if you press ⌘-S after selecting a disk to check or repair, reports F. Stephen Costa of Loudonville, New York.

To guard against premature floppy failure, keep disks and disk drives away from magnetic fields. That includes a telephone with a traditional bell ringer and the power supply (located on the left side) of the Mac Plus, the 512K, and the 128K.

Coprocessor Confusion

Q Since the load of virtual-memory on the Mac II is handled by the 68881 coprocessor, wouldn't this make it faster than Macs having a 68030 central processing unit (CPU)? Could the 68882 replace the 68881 in a Mac II? Can the 68882 perform virtual-memory tasks?

Michael J. Sanders
Address unknown

A The Motorola 68881 coprocessor handles complex math functions on the Mac II. The Motorola 68882 is a newer, faster math coprocessor and is used in the Mac IIx, IIcx, and IIci.

You can replace the 68881 in a Mac II with a 68882. Expect 25 to 40 percent improvement in tasks that involve lots of number processing, such as math calculations, statistics, and calculations of new views of complex graphics. An application designed to take advantage of the 68882's features can boost its numeric processing speed by as much as 100 percent. But otherwise, installing a 68882 has no direct benefit aside from speeding up floating-point numeric calculations.

A Mac II's 68020 CPU can use virtual memory only if you replace the standard memory-management coprocessor with a 68851 paged memory management unit (PMMU) coprocessor. You'll also need virtual-memory software, either Virtual 2.0 from Connectix (415/324-0727), or System 7.0—due out sometime this year—or A/UX from Apple. The Mac IIx, IIcx, and IIci don't need a 68851, since its functions are built into their 68030 CPUs.

The 68882 and 68851 chips are available from several sources, including Total Systems Integration (800/874-2288, 503/345-7395) and Tercom (206/527-1257, 800/544-9543 from 7 a.m. to 7 p.m., 800/669-7555 from 10 a.m. to 6 p.m.). Orvac Electronics (714/871-1020) has the 68851. Be sure to get 16MHz chips for a Mac II.

If you install a 68851 PMMU in your Mac II and the screen goes blank, the



chip socket on the main logic board is probably missing some pins. Take it to an Apple dealer for a free replacement logic board.

Warning: Chips have delicate pins and can sustain latent damage from static discharge during handling. Have a technician make the swap unless you know what you're doing.

Faster Faster, Best Best

Q I realize I can get a faster Faster quality on an ImageWriter II by pressing the Shift, Option, and Caps Lock keys while clicking OK in the Print dialog. The ImageWriter II then prints bidirectionally (as the print head moves left and right) instead of unidirectionally (only as the print head moves right). Bidirectional printing is faster but slightly lower quality than unidirectional printing.

In Best quality, the ImageWriter II normally prints bidirectionally. How can I make it print unidirectionally for absolutely the best Best quality?

F. Stephen Costa
Loudonville, New York
(continues)

A You can't make an ImageWriter print unidirectionally in Best quality. And the print quality would not be any better if you could. Ideally, the ImageWriter II would always print bidirectionally because that's faster than unidirectional printing. However, some ImageWriter IIs don't line up dots properly when printing bidirectionally in Faster quality. The ImageWriter driver software works around this glitch by printing unidirectionally in Faster Quality.

Multiple Graphs and Data

Q Is there an application that can save three sets of data and produce three charts in one file? I use a Macintosh SE.

Karen Melzer
Rexdale, Ontario, Canada

A Any spreadsheet can keep multiple sets of data in one file as long as the total amount of data doesn't exceed the maximum spreadsheet size. Wingz from Informix (913/492-3800) and Full Impact from Ashton-Tate (213/329-8000) both let you create multiple charts in one spreadsheet document.

When you use a single spreadsheet for more than one set of data, put each set in a separate work area. Arrange the work areas along an imaginary diagonal line running from the upper-left corner of the spreadsheet to the lower-right corner (see "Diagonal Construction"). That way if you

need to insert or delete rows and columns in one set of data later, the action won't affect the other sets. If you lay out your sets of data side by side, changes to one set may adversely affect other sets.

Auto-Scroll Substitute

TIP: Panorama doesn't scroll automatically if you try to drag or resize an object past the boundary of a forms window in graphics mode. You can lessen the likelihood of bumping into the window boundaries by working in a reduced view. To reduce the view, select the magnifying glass tool, press the space bar, and click. All the tools work in reduced views. It's also possible to resize or place an object beyond the window boundaries by using the Dimension command (on the Edit menu).

To return the view to actual size, select the magnifying glass tool and click once while pressing the ⌘ key.

Paul Chance
Huntington Beach, California

Quick Move

TIP: Before leaving one page to work on another in PageMaker, choose Fit in Window from the Page menu (shortcuts: ⌘-W or, when working in actual size, Option-⌘-click). When you return to that page, you can quickly and precisely go to any part of it. To do that, press Option-⌘ for actual size, or Shift-Option-⌘ for 200 percent enlargement, while clicking on the area you

want to see. By comparison, scrolling at actual size or at a magnified view is much slower and less precise.

Rick Archer
Fairfield, Iowa

Surface and Contour Plots

TIP: Wingz has two problems related to surface and contour graphs.

First, Wingz uses a seemingly random set of colors that makes contour graphs and surface graphs not only ugly but more confusing than if they had no color. You typically want the color bands to vary smoothly from one color at the vertical axis (z axis) minimum to a different color at the maximum. Those of us not yet fortunate enough to own a color laser printer generally want a smooth variation of gray shades from black to white. "Shaded Surface" shows the difference.

Second, you cannot conveniently set the number of color bands on a contour graph. The color bands correspond to vertical-axis divisions, but the vertical axis does not appear on a contour graph, so you cannot change its number of divisions. To work around this problem manually, you must first plot your data as a surface graph. There you select the vertical axis, choose Scale Info from the Axes submenu of the Graph menu, and set the Manual Scale option and the number of divisions. You can then replot the surface graph as a contour graph with the correct number of color bands by choosing Contour from the Gallery submenu of the Graph menu.

The Wingz script in "Smooth Variations" solves both problems. It sets the vertical axis for 16 shades of gray, which produces good results when printed on a 300-dpi LaserWriter using LaserWriter driver 6.0. (For more gray levels, change the script to set *variable number* to a number higher than 16.) To use the script, simply select the contour or surface graph to be converted and run the script.

Bill White
Livermore, California

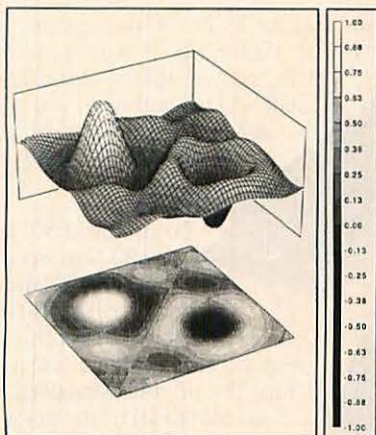
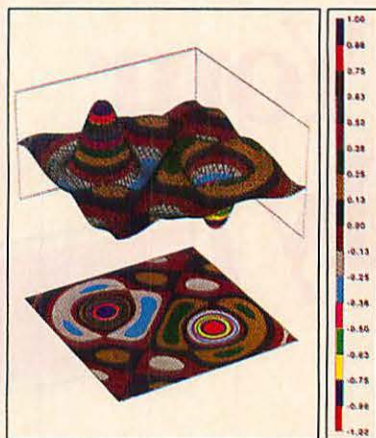
ADB Mating Cycles

TIP: Mac SE and SE/30 owners who regularly transport their systems may soon face some expensive repair bills. Apparently the ADB connectors used (continues)

	A	B	C	D	E	F	G	H	I	J	K	L
1	123456789	123456789	123456789	123456789								
2	123456789	123456789	123456789	123456789								
3	123456789	123456789	123456789	123456789								
4	123456789	123456789	123456789	123456789								
5	123456789	123456789	123456789	123456789								
6	123456789	123456789	123456789	123456789								
7	123456789	123456789	123456789	123456789								
8	123456789	123456789	123456789	123456789								
9	123456789	123456789	123456789	123456789								
10	123456789	123456789	123456789	123456789								
11	123456789	123456789	123456789	123456789								
12	123456789	123456789	123456789	123456789								
13					123456789	123456789	123456789	123456789	123456789			
14					123456789	123456789	123456789	123456789	123456789			
15					123456789	123456789	123456789	123456789	123456789			
16					123456789	123456789	123456789	123456789	123456789			
17					123456789	123456789	123456789	123456789	123456789			
18					123456789	123456789	123456789	123456789	123456789			
19					123456789	123456789	123456789	123456789	123456789			
20					123456789	123456789	123456789	123456789	123456789			
21					123456789	123456789	123456789	123456789	123456789			
22					123456789	123456789	123456789	123456789	123456789			
23					123456789	123456789	123456789	123456789	123456789			
24					123456789	123456789	123456789	123456789	123456789			
25										123456789	123456789	123456789
26										123456789	123456789	123456789
27										123456789	123456789	123456789
28										123456789	123456789	123456789
29										123456789	123456789	123456789
30										123456789	123456789	123456789
31										123456789	123456789	123456789
32										123456789	123456789	123456789
33										123456789	123456789	123456789
34										123456789	123456789	123456789
35										123456789	123456789	123456789
36										123456789	123456789	123456789

Diagonal Construction

By organizing different parts of a spreadsheet along an imaginary diagonal, you prevent changes in one part from inadvertently affecting other parts.



Shaded Surface

Standard Wingz colors in surface and contour graphs don't provide useful shading information (top). Applying the script in "Smooth Variations" to those graphs achieves smooth, intuitive shading (bottom).

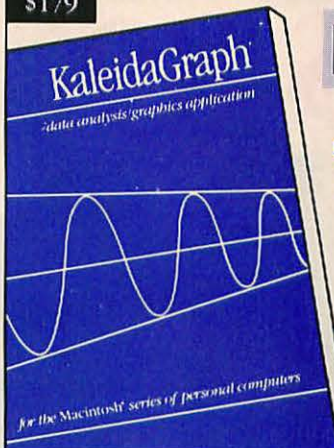
in the keyboard and the Mac may wear out after only 500 mating cycles. If you disassemble and transport the Mac to and from work every day as I do (two mating cycles per day), expect your keyboard and Mac ADB connectors to last less than one year. If you frequently transport your Macintosh, I recommend leaving the keyboard and mouse cables attached.

If the keyboard or mouse starts operating only intermittently, press the various connectors to try to determine which one is bad. Connectors are fairly easy to replace (some soldering is required). This route is far less costly than replacing the keyboard or main logic board (your dealer's likely recommendations). The connector is AMP part number 749264-1 or 7491811 (call 800/522-6752 for the name of an AMP distributor). Do not use other

\$295



\$179



Access text and graphics mainframe applications from one easy-to-use program

■ **EMULATE** industry standard text and graphics terminals, including the DEC VT100, DG D200, Tektronix 4014 and Tektronix 4105 ■ **COMMUNICATE** with a wide variety of mainframe computers or information services ■ **TRANSFER** files using popular protocols, including XModem, YModem and Kermit ■ **BACKGROUND** operation is supported under MultiFinder.

developed by **AS** Abelbeck Software

Import data, analyze the data, and generate scientific and business graphics from one easy-to-use program

■ **FLEXIBLE** data import facilities ■ **FAST** operation (5 to 20 times faster than Cricket Graph™ version 1.2) ■ **LARGE** data sets supported (32,000 data points per variable) ■ **FEATURES** including: curve fitting; log, linear, polar and probability plots; high-resolution printing ■ **PROGRAMMABLE** RPN Calculator and Algebraic Formula entry.

See us at Moscone Booth 2448

SYNERGY SOFTWARE

2457 Perkiomen Ave., Reading, PA 19606, 215-779-0522

Circle 286 on reader service card

COPY II[®] for Apple Macintosh

ver. **7**

Copy II for the Macintosh is a collection of three utility programs and a new desk accessory, Locate. Copy II combines powerful utilities which enable you to: maintain and repair your floppy and hard disks, create archival backups and allow you to install applications directly onto your hard disk.

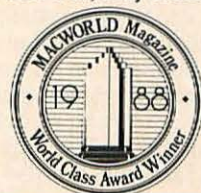
Here is what the experts say: "It's a well-rounded collection of useful disk utilities that no Macintosh user should be without."

John Gillett
Macworld 5/89

and

"... Copy II is now a utilities package whose components are powerful, useful, and, best of all, easy to use."

Jake Paden
MacUser 3/89



SEARCH AND FIND

Locate is a fast information finder in a desk accessory. You can search for full or partial file names, up to three key words, or both. Once found, Locate displays the information and under MultiFinder will launch the application.

Requirements: Mac 512e, MacPlus, Mac SE, Mac II. Supports H.F.S., M.F.S., 400K and 800K disks, 1 or 2 drives, hard disks and all available memory.

To Order: see your local dealer.

\$39.95

**Central Point
Software**

INCORPORATED
- Founded in 1981 -

15220 N.W. Greenbrier Pkwy., #200
Beaverton, OR 97006 USA
503/690-8090

Tomorrow's Upgrade For Your Mac Is Only \$89*

MacWAREHOUSE SALE

A MacWarehouse Memory Expansion Kit will dramatically increase the power of your Mac. And our fast, reliable, overnight service will have your Kit in your hands tomorrow!

MORE BRAIN POWER FOR YOUR MAC

Never again will you have to quit your word processor just to answer a question about a spread-sheet. Install extra memory and you can leave your letter open while you refer to last month's sales figures. You can edit those monstrous scanner files with advanced graphics applications or develop your own custom HyperCard stacks. More memory means more power at your fingertips.

PLUG IN INSTALLATION

Adding memory doesn't require technicians in lab coats. You don't even need a soldering iron. Just open your Mac, slide out the main circuit board, and plug in your memory card. Complete installation instructions are included with each memory kit.

WHAT DO I NEED?

Our helpful sales and technical staff is standing by to answer any questions and take the mystery out of memory upgrades. Memory cards come with one megabyte on each card and are usually sold in pairs — (2@ \$89 each).

The chart explains exactly what you need to achieve the desired level of performance.

To upgrade a 4-socket Mac Plus or SE to this amount of memory	Do this: (Install in multiples of two only)
2 MB	Remove all four existing 256K SIMMs, install two 1M SIMMs, leave two sockets for future expansion.
2½ MB	Remove only two 256K SIMMs, install two 1M SIMMs.
4 MB	Replace all four 256K SIMMs with four 1M SIMMs.
To upgrade an 8-socket Mac II, IIfx, IIfx, or SE30 to this amount of memory	Do this: (Install in multiples of four only)
4 MB	Remove all four existing 256K SIMMs, install four 1M SIMMs, leave remaining sockets for future expansion.
5 MB	Keep existing 256K SIMMs, install four 1M SIMMs in remaining sockets.
8 MB	Remove all four 256K SIMMs install eight 1M SIMMs.

To open your Mac Plus or SE, you'll need a specially designed tool — it's available from us as part of a handy tool kit for just \$15.

WHAT YOU NEED TO KNOW

Memory chips come factory-installed on plug-in cards, called SIMMs (Single In-line Memory Modules). Each one megabyte SIMM card holds eight top quality, memory chips. We carry chips by all the major manufacturers like Texas Instruments, Intel and Samsung. We also carry the full line of Dove memory products.

*Prices can vary a lot, based on quality, speed and demand. At press time

our price for 1MB, 120 ns Samsung kits is \$89. Please call for the very latest prices and availability. Our sales staff will tell you what you need and help make your choice an easy one.

SPEED

Do you need 80, 100 or 120 Nanosecond (ns) chips? Nanoseconds are billionths of a second, so an 80 ns chip responds faster than a 100 ns chip. The original Mac used relatively slow 150 ns memory chips. The 68020 processor needs 120 ns (or faster) chip, and the 68030 Macs like the speedier model.

OVERNIGHT DELIVERY

Place your order by 12:00 a.m. (E), weekdays and we'll deliver overnight for just \$3.00. There's never been a better time to consider a memory upgrade. Call our toll-free number now and tomorrow morning your Mac will be off to a brand new start.

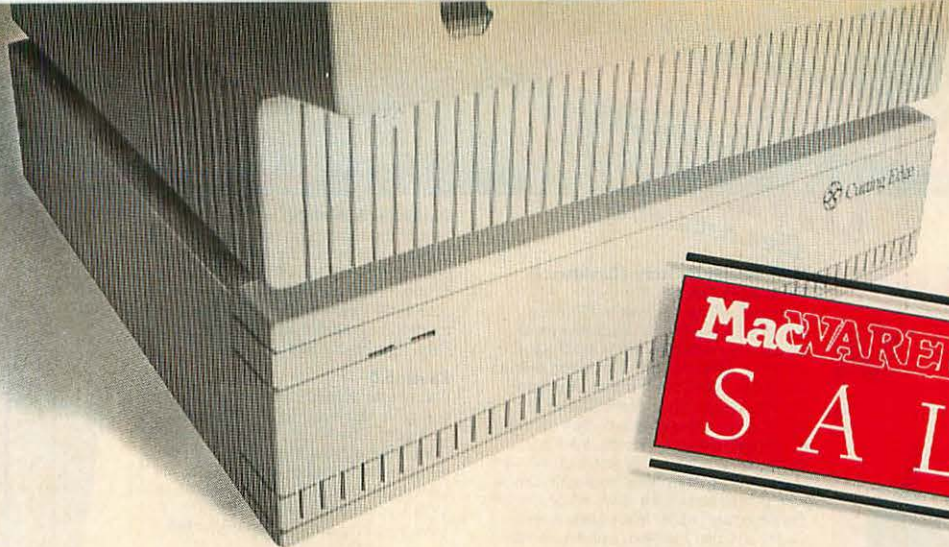
MacWAREHOUSE™
1-800-255-6227

Call toll-free
Twenty-four hours a day,
seven days a week.
Inquiries 1-201-367-0440
Fax 1-201-905-9279
© Micro Warehouse Inc.

MACWAREHOUSE 30 DAY MONEY BACK GUARANTEE

If, for any reason, you are dissatisfied with your MacWarehouse Memory Kit, you may return it for a full refund within thirty days of purchase. All you have to do is call us for a return authorization number and return the product, postage paid, in its original condition, with the original packaging and documentation.

ONE YEAR WARRANTY. MacWarehouse also guarantees its Memory Kits against manufacturer defects for one year from the date of purchase. We will repair the item or replace it at our discretion.



Buy a Hard Drive Now And Save Up To \$300

"The best deal in hard drives just got better!"

Between now and March 31st, MacWarehouse is offering savings on every hard drive we sell. So, if you're thinking of buying a new hard drive, your timing couldn't be better. Check out our sale prices and your savings, compared to our December 1989 prices, in the chart.

We offer drives by leading manufacturers like Cutting Edge, C.M.S., Quantum, Dolphin, PLI Infinity Turbo and others — all at unheard of low prices.

Let our helpful sales staff take the hassle out of buying a drive. They'll tell you which

MONEY BACK GUARANTEE

They'll tell you which drives come with the MacWarehouse 30-day money back guarantee. Try one at home. And if, for any reason, you're not 100% satisfied,

LIMITED TIME OFFER

MacWarehouse sale prices, based on capacity, are shown in the chart. Also shown are the savings from pre-holiday prices. (This is a limited time offer, valid

through March 31, 1990.) Overnight delivery is just \$3, anywhere in the Continental United States.

So call us now and tomorrow morning you'll be up and running with the best hard drive deal in the business!

	20 + MB		30 + MB		40 + MB		60 + MB		80 + MB		***40+ Removable	
	SALE PRICE	YOU SAVE	SALE PRICE	YOU SAVE	SALE PRICE	YOU SAVE	SALE PRICE	YOU SAVE	SALE PRICE	YOU SAVE	SALE PRICE	YOU SAVE
Cutting Edge	359	\$80	439	\$60	499	\$50	599	\$30	659	\$80	819	\$80
CMS, MacStack	459	\$70	499	\$46	599	\$26	649	\$50	769	\$30	839	\$36
Dolphin, Integra	429	\$70	479	\$116	549	\$170	615	\$163	695	\$300	879	\$260
PLI, Infinity Turbo	-	-	569	\$20	619	\$26	-	-	-	-	1098	\$21
*Quantum Internal	-	-	-	-	499	\$26	-	-	829	\$40	-	-

Savings are calculated from MacWarehouse December 1989 published prices. *Quantum drives are for internal installation and require a 3.5 Internal Drive Kit for \$39. **PLI is a 50meg turbo drive. ***40+ meg Removable Cartridge Drives come with 1 cartridge. Additional cartridges available.

just return it to us within thirty days and we'll refund your money.

Then there's the MacWarehouse Loaner Drive Program. Buy from MacWarehouse and if you ever have a problem, you won't be without a drive for more than a few hours.

READY TO USE

A hard drive from MacWarehouse couldn't be easier to use. We'll tell you which ones come pre-formatted — ready to use right out of the box. You just plug in, turn on your Mac and go!

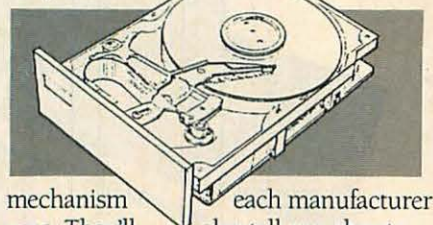
If you do need any help, the MacWarehouse Technical Support staff is standing by our toll-free lines to assist you.

MacWAREHOUSE™
1-800-255-6227

Call toll-free
Twenty-four hours a day,
seven days a week.
Inquiries 1-201-367-0440
Fax 1-201-905-9279
© Micro Warehouse Inc.

MacWarehouse 30-Day Money Back Guarantee

Many of our drives come with the MacWarehouse 30-Day Money Back Guarantee. If, for any reason, you're not completely satisfied, call us within thirty days of receipt for a return authorization number and full refund of the purchase price.

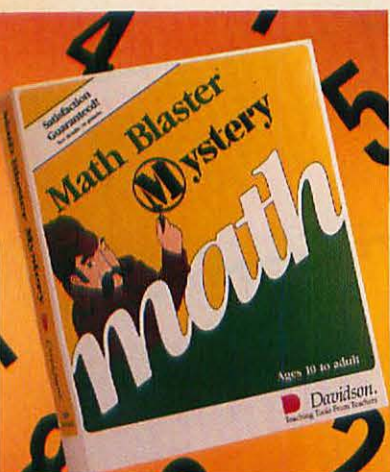


mechanism each manufacturer uses. They'll also tell you about access speed, reliability, software and the manufacturer's warranty.

OVERNIGHT DELIVERY
ONLY \$3.00
 (See details below)

GUARANTEE

Many of our products come with a thirty day money back guarantee, if you are not completely satisfied. Ask for details when you place your order.



ACCESSORIES

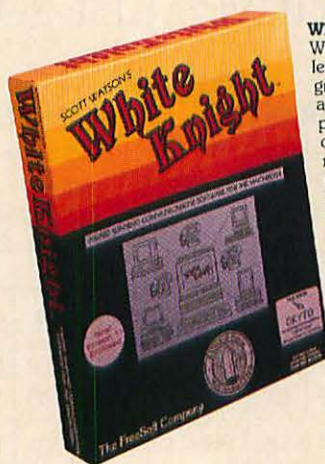
Apple	
Toner Cartridges LaserWriter	111.
Avery Labels (full line available)	
Color Coded 3.5 Diskette	4.
Laser 3.5 Diskettes	29.
Laser File Folders	6.
Laser Transparencies	22.
Basic Needs, Inc.	
HardTop Keyboard Covers	15.
HardTop ImageWriter Covers	17.
Keyboard Flip	6.
Dust Covers - Grey Nylon Ripstop	
ImageWriter or LaserWriter	12.
Mac Plus and keyboard	11.
Mac SE & extd. or reg. keyboard	11.
Mac II and extd. keyboard	12.
Universal Laser Printer Stand	28.
Utility Pac	11.
Computer Friends, Inc.	
MacInker (IW & IW II)	41.
Curtis	
Computer Tool Kit (52 pc.)	49.
Curtis Clip	6.
Disk Holder (holds 40)	9.
Jewel Surge Suppressors	Call.
Ergotron	
MacTilt-SE	68.
MacTilt II-RGB	75.

Math Blaster Mystery (Davidson & Associates, Inc.)

Surprise! While you weren't looking somebody put the fun back into math equations, word problems and logical thinking. Who dunnit? Davidson & Associates did...with Math Blaster Mystery! For ages 10 to adult, Math Blaster Mystery offers four challenging activities covering positive/negative numbers, fractions, decimals, percents, interest and pre-algebra. Exciting Animation and sound motivate you to search for clues while climbing the detective ladder from Computation Cadet to Chief Problem Solver! (educational/personal) \$26.

Goldstein & Blair

The Macintosh Bible	20.
I/O Designs	
Imageware II Carrying Case	49.
Macinware IIcx Carrying Case	85.
Macinware Mac II Carrying Case	99.
Macinware Plus Carrying Case	64.
Macinware SE Carrying Case	75.
Monitorware Apple RGB Case	79.
The Ultimate SE Carrying Case	79.
Kalmar	
Rolltop Teak disk holder 45	14.
Rolltop Teak disk holder 90	21.



Kensington

Anti-Glare Filter	33.
Apple Security Kit	34.
Mac II Stand w/Cable Kit	64.
MasterPiece Mac II	105.
PowerBacker 360 UPS Line	269.
PowerBacker 800 UPS Line	749.
PowerBacker 1200 UPS Line	949.
System Saver	63.
Mobius Products	
Fanny Mac QT	59.
SE Silencer	39.

Macintosh SE/Plus w/Extended Keyboard Carrying Case (Targus)

Pamper your Mac with a Targus carrying case made of Zilicone treated nylon to give you waterproof durability and an impact absorbing high-density foam layer with a soft protective lining for complete protection. Cushioned shoulder pad and handles provide extra comfort and convenience. Plus there's room for everything from your Mac, a hard disk drive, and the extended keyboard to pockets for your mouse, floppies, cables, and pens. Full Targus Macintosh line available in black. Some styles available in blue, burgundy, and platinum. (accessories) \$69.

DeskPaint & Desk Draw (Zedcor)

One of the most powerful Paint DAs for the Mac is now bundled with the most powerful Draw DA. PICT, TIFF and MacPaint compatible. Works great with scanners! Features include autotrace, free rotation of graphics and text and on-line help. (graphics) \$64.

ZBasic 5.0

Create true double clickable applications using the Mac's most powerful Basic Compiler, ZBasic. Includes the program Generator, a draw-like editor that takes the grunt work out of writing REAL Macintosh applications. Features include MS basic conversion utilities and 100's of example programs. (language) \$89.

Polaroid

Circular Polarizing Filter	35.
Read-Write	
CompuDuster	29.
Kleen & Dry CRT Pads	5.
Computer Care Kit	45.
Smack-a-Mac	
Smack-a-Mac	9.
SoundSight	
FastKeys 2.0	35.
Targus, Ltd.	
Deluxe Plus/SE-XKB Case (black)	69.
ImageWriter II Case (black)	45.
Mac Plus/SE Case (black)	55.
IIcx/IIci Case	Call.

White Knight 11.0 (FreeSoft)

White Knight is Scott Watson's successor to the legendary Red Ryder telecommunications program. It's more than just a new version - the added new features list alone is more than 20 pages long! The 270+ pg. manual has plenty of step by step tips to help beginners communicate like the pros in no time. White Knight comes bundled with Okyto, a revolutionary Mac-to-Mac file transfer program. A free subscription to the Genie network is also provided. (communications) \$89.

ACCOUNTING & PERSONAL FINANCES

Aatrix	
Checkwriter	37.
Payroll 3.5	109.
Payroll PLUS	149.
TimeMinder	175.
Bedford (Computer Associates)	
Simply Accounting	225.
DAC	
Dac-Easy Light	42.
Intuit	
Quicken 1.5	36.
Layred, Inc.	
at Once!	285.
MECA	
Managing Your Money	124.
Monogram	
Business Sense	269.
Dollars and Sense	81.
Nolo Press	
For The Record	29.
WillMaker	32.

Casino Master (Centron)

Let it Ride! You can bet on having hours of fun with Casino Master's five exciting casino games. Includes **Blackjack Ace**, **Crapsmaster**, **Roulette Master**, **Pokermaster** and **Baccarat Master**. Exact table simulation, mouse controlled betting, selectable bankroll, stored win/lose statistics and complete manual included. Mac II version available in full color! An odds-on favorite with professional gamblers. (entertainment) Individual games \$27.each/ 5 game Casino Master Package \$49. / Deluxe Mac II version \$55.



ShopKeeper Software

Bill-It 2.0	99.
Softview	
MacInTax Federal '89 - 1040	65.
State supplements	ea. 56.
MacInTax/Quicken 1.5 bundle	95.
Taxview 1040	355.
Survivor	
MacMoney 3.5	60.

BLANK MEDIA

B.A.S.F. made in U.S.A

DS/DD (box of 10)	14.
DS/High Density (1.44 Meg)	24.
Peripheral Land, Inc.	
Turbo 40 Cartridge	115.
Sony	
DS/DD (box of 10)	14.
DS/HD (1.44 mb)	25.

BUSINESS & PRESENTATION

A Lasting Impression

ResumExpert (word vers.)	39.
Cover Letters or Students	39.
Manager Edition	39.
Sales and Marketing Edition	39.
Adobe Systems, Inc.	
TrueForm SetUp	225.
AEC Management Systems	
FastTrack Schedule	115.

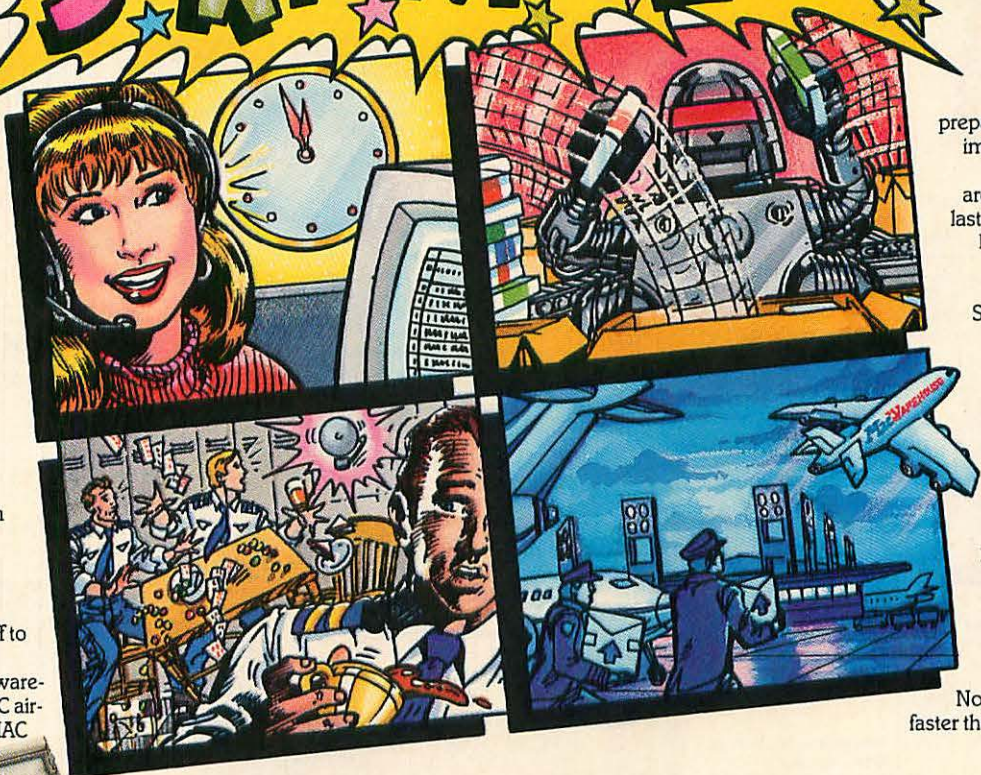


SCRAMBLE!

Nightmare!
It's midnight and your hard disk crashes. Or you read about a new piece of software you just can't do without.

Remember, the sun never sets on the folks at MacWarehouse. Ring...ring (only three rings?)... "How may I help you?"... "No problem Sir, we'll take care of it... We'll get it to you overnight — and the charge is just \$3."

While you drift off to sleep the computers whirr. At our satellite warehouse — a former SAC air force base — ROBOMAC



prepares your order for immediate dispatch.

The flight crews are standing by. One last hand of Old Maid.

Don't want to miss that last order at 12:01! Then,...

SCRAMBLE! They'll fly through the night to deliver your order (and thousands of others) not long after the morning paper.

That's right.

Order until 12:00 am for overnight delivery. It's called MIDNIGHT EXPRESS SERVICE and nobody else has it.

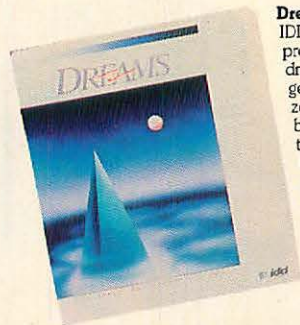
Nobody gets it to you faster than MacWarehouse... Nobody!



Win the NEW Mac Portable!

It's here at last! It has all the power and convenience of your Mac in a 15.7 pound portable package.

And you can win the new Macintosh Portable by entering the MacWAREHOUSE PORTABLE COMPUTER GIVEAWAY. Your name is automatically entered into the drawing when you order from MacWAREHOUSE, or when you fill out and send in the Official Entry Coupon below.



Dreams (Innovative Data Design)

IDD, creator of MacDraft, offers a powerful precision drawing tool for professional scaled drawings, illustrations, presentations and general purpose graphics. Dreams offers zoom, rotation, layers, dimensioning, symbol libraries and a vast array of drawing tools, as well as many advanced illustration features. You can merge shapes together, cut edges of objects using other objects as templates...even glue lines and curves together to form unique shapes to be filled with colors or patterns. (graphics) \$325.



MacInTax Federal '89-1040 (Softview)

MacInTax Federal '89-1040 guides you through the process of preparing your Federal Taxes (eight state tax modules also available at \$56 ea.). Just type in the requested numbers, and MacInTax does the rest. When finished, print the completed return on the LaserWriter or the ImageWriter. If you used MacInTax last year, it reads those files and brings forward relevant items, saving time and reducing errors. Its tax planner shows the effects of various tax strategies. (finance) \$65.

SuperPaint 2.0 (Silicon Beach)

SuperPaint gives you the freedom of paint and the precision of draw in one easy-to-use program! Features powerful AutoTrace to automatically convert bitmapped paint graphics into high resolution draw objects, an adjustable airbrush, and a freehand tool to quickly sketch editable Bezier curves. You can mix fonts, styles and sizes within text blocks, and freely rotate, scale, or slant text and graphics without sacrificing high-resolution output. Oversized documents automatically "tile" over multiple pages, in either "Portrait" or "Landscape" orientation. (graphics) \$125.



I'm Kerry, call me at:

MacWAREHOUSE™

1-800-255-6227

(1-800-ALL-MACS)

Inquiries:

FAX: 201-905-9279

Call anytime — day or night
24 hours a day, seven days
a week

*Midnight Express service available
weekdays.

OFFICIAL ENTRY COUPON

MacWarehouse Portable Computer Giveaway
1690 Oak Street, P.O. Box 1579, Lakewood, NJ 08701

When you order by phone or mail, you are automatically entered in the drawing. You can also mail this coupon or call our contest entry line. 1-800-367-0787. (In CT., call 1-203-852-8968)

Name _____

Address _____ Apt. _____

City _____ State _____ Zip _____

MWDØ



FROM MacWAREHOUSE



FastLabel

End label hassles with FastLabel - the revolutionary way to print labels on the ImageWriter and LaserWriter. Pre-formatted templates to instantly create labels. One step text loading from any commercial database. Save hours of your valuable time! (business) \$49.



Managing Your Money

A fully integrated software program addressing every aspect of personal and small business finance. Write and print checks, set up a personal budget, estimate your taxes and more. (finance) \$124.



Ferrari Grand Prix

Gentlemen Start Your Engines! Squeeze into the cockpit of this thrilling Formula One racing simulator. Test your skill, concentration and nerve while chasing two cagey opponents around world famous Grand Prix courses. Handicap opponents and personalize race-courses for exciting competition. Spectacular sound and graphics. (entertainment) \$32.



Dyndex-Instant Address Book

Fast on-line address database that prints elegant, double-sided address pages for Filofax, Day-Timer, and most organizer systems. Includes binder, divider tabs, and 100 sheets of "no-fuss" laser paper. Powerful database functions include find, sort, select, import, export, merge, auto-dial, and much more. (business) \$89.

Odesta

Double Helix III	339.
GeoQuery	199.
ProVUE	
Panorama	257.

DESK ACCESSORIES

Casady & Greene

QuickDEX	31.
JAM Software	
Smart Alarms & Appt. Diary	49.
Smart Alarms (1 - 4 users)	99.
Smart Alarms (5 - 8 users)	149.
Smart Alarms (9 - 16 users)	199.

Preferred Publishers

Database 1.5	69.
Vantage 1.5	52.
Solutions	
SmartScrap & The Clipper 2.0	45.

DESKTOP PUBLISHING

Aapps

MicroTV	289.
---------------	------

Aldus

PageMaker 3.02	385.
PageMaker Color Extension	135.

Broderbund

DTP Advisor	47.
-------------------	-----

Data Translation

PhotoMac	609.
----------------	------

Emerald City Software

Smart Art I, II, or III	ea. 85.
-------------------------------	---------

Icom Simulations

MacKern	119.
---------------	------

Letraset

ColorStudio or FontStudio	Call.
---------------------------------	-------

ImageStudio	275.
-------------------	------

Ready, Set, Go!	275.
-----------------------	------

VocabuLearn (Penton Overseas, Inc.)

A computer enhanced foreign language learning system for the Mac. A versatile, interactive HyperCard Stack, available in five languages and two levels. Each comes with two 90 minute audio cassettes, a handy size word list with over 1500 useful words and expressions, and HyperCard V.1.2. This is a great bilingual aid. Ideal learning tool for students, travelers, business people, and educators alike. Increase your comprehension using the building blocks of language! (education) French, Spanish, German, Italian \$30. ea. Japanese \$36.



Olduvai

Read-It! 2.1 (OCR)	245.
Read-It! Personal 2.0	125.
Read-It! TS (ThunderScan)	79.

Quark

QuarkStyle	169.
Xpress	449.

Spinnaker/Springboard

Plus 1.1	115.
Springboard Publisher II	109.

TimeWorks

Publish-It!	225.
-------------------	------

DISK DRIVES/BOARDS

Aristotle Industries, Inc.

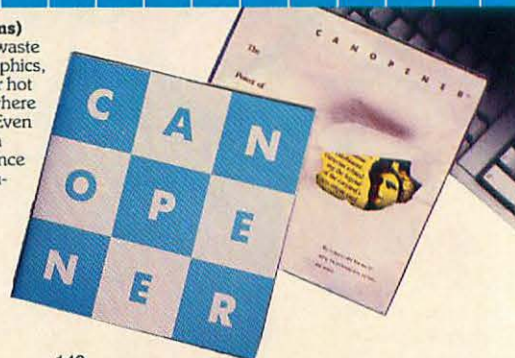
HardPac Mac 20 Meg	469.
HardPac Mac 40 Meg	749.
HardPac Mac 80 Meg	1089.
HardPac Mac 105 Meg	1229.

CMS

MacStack 20 Meg	459.
MacStack 30 Meg	499.
MacStack 45 Meg	599.
MacStack 60 Meg	649.
MacStack 80 Meg	769.
MacStack 44 Meg Removable	839.

CanOpener 1.1 (Abbott Systems)

Raider of the lost bytes! Don't waste time digging for buried text, graphics, sounds etc.... With CanOpener hot on its trail you can search anywhere and retrieve almost anything. Even locates text within pictures then gives you the whole picture! Once found, store information in CanOpener's personal library for safekeeping. (utility) \$65.



Cutting Edge

800K External Floppy Drive	149.
SyQuest Removable 45 Meg	819.
Under the Mac 20 Meg	359.
Under the Mac 30+ Meg	439.
Under the Mac 45+ Meg	499.
Under the Mac 60+ Meg	599.
Under the Mac 80+ Meg	659.

Dayna Communications

Dayna File Single 360K (5 1/4")	525.
Dayna File Dual 360K & 1.44M	729.

Dolphin Systems Tech

Integra 20 Meg	429.
Integra 30 Meg	479.
Integra 40 Meg	549.
Integra 60 Meg	615.
Integra 80 Meg	695.
Flipper 44 Meg	879.

Fujitsu

800K Disk Drive	159.
-----------------------	------

Kenneth Technology

Drive 2.4	329.
Rapport	199.

EDUCATIONAL/PERSONAL

Beacon Technology

GEMS of the Word	25.
------------------------	-----

BrightStar

Alphabet Blocks	30.
-----------------------	-----

Talking Tiles

.....	27.
-------	-----

Software Software

ResumeWriter Pro	58.
------------------------	-----

Davidson

Math Blaster Mystery	26.
----------------------------	-----

Speed Reader II	26.
-----------------------	-----

First Byte

The Dinosaur Discovery Kit	27.
----------------------------------	-----

The Puzzle Storybook	27.
----------------------------	-----

The Rhyming Notebook	27.
----------------------------	-----

Help Software, Inc.

Desktop Help for Excel	50.
------------------------------	-----

Learning Company

Math Rabbit	31.
-------------------	-----

Reader Rabbit	31.
---------------------	-----

MicroTech

Elementary Signer	49.
-------------------------	-----

Finger Speller	29.
----------------------	-----

Nordic Software (full line available)

MacKids Turbo Math Facts	28.
--------------------------------	-----

MacKids Preschool Pack	35.
------------------------------	-----

MacKids Word Quest	30.
--------------------------	-----

Penton Overseas

VocabuLearn French, Spanish, German, Italian	ea. 30.
--	---------

VocabuLearn Japanese	36.
----------------------------	-----

The Software Toolworks

Mavis Beacon Teaches Typing	32.
-----------------------------------	-----

Visionary Software

Synchronicity	39.
---------------------	-----

Voice & Video Instruction Videos

HyperCard or Pagemaker 3.0	ea. 35.
----------------------------------	---------

Word 4.0 Video Tape	35.
---------------------------	-----

Peripheral Land, Inc.

Infinity Turbo 40 Meg	1098.
-----------------------------	-------

Turbo Floppy 1.4	359.
------------------------	------

Quantum

Quantum 40 MB Raw Drive	499.
-------------------------------	------

Quantum 80 MB Raw Drive	829.
-------------------------------	------

RasterOps

RasterOps Colorboard 264	760.
--------------------------------	------

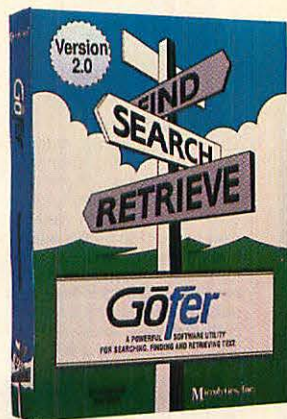
The "ULTIMATE" SE Carrying Case (I/O Design, Inc.)

The "ULTIMATE" SE Carrying Case is designed with the same high quality standards as our other MacLuggage products. This case offers internal, padded compartments for ANY Macintosh keyboard, mouse, external hard disk and cables. It also features 2 additional exterior pockets for everything from disks to umbrellas. Combine these features with sturdy Dupont Cordura nylon and 1/2 inch high density foam padding and you'll see why this is the "Ultimate" carrying case for your Mac.(accessories) \$79.



MORE FOR YOUR MONEY...

Aldus	
Persuasion 2.0	339.
Antic Software	
FlexForm Bus. Temp Vol 1 or 2 ea.	49.
Ashton-Tate	
Full Impact	249.
Claris	
MacProject II	369.
SmartForm Designer w/Assistant	295.
Cognition Technology	
MacSMARTS PRO	249.
Cricket (Computer Associates)	
Cricket Graph 1.3	115.
Cricket Presents	285.
HyperPress Publishing	
Intelligent Developer	219.
Informix	
WingZ 1.1	249.
Microsoft	
Excel 2.2 or PowerPoint 2.1	ea. 249.
The Microsoft Office	599.
Works 2.0	185.
Portfolio Systems	
Dynodex-Instant Address Book	89.
Power Up	
Address Book Plus	53.
Address Book Plus w/Binder	99.
Calendar Creator	38.
FastForms!	89.
Letter Writer Plus	53.



Gopher (Microlytics)

The ultimate text finder. A powerful software utility that searches, finds and retrieves text. Searches through countless files on your hard disk drive or floppy disks to find the text you need. A phrase, a fact, a note, a date. If you need it, Gopher finds it in seconds. You can automatically import the section of text into the document you're currently working in. You save hours searching through files. Gopher operates as a Macintosh desk accessory. (utility) \$45.

Preferred Publishers

Direct Mail	
ProPlus	54.
Wall Street Investor	449.
Satori	
Bulk Mailer 3.2.3	78.
Softstream International	
Endeavour Planner	95.
Symantec	
More II 2.01	249.
Symmetry	
KeyPlan	249.
Synex	
MacEnvelope 4.1	79.
MacEnvelope Plus	149.
MacPhonebook	40.
Vertical Solutions	
FastLabel	49.

CAD/CAE

Claris	
ClariscAD	595.
Generic Software	
Generic CADD Level 1	84.
Graphsoft	
MiniCad+2.0	519.

TravelModem (Prometheus)

The TravelModem from Prometheus combines all the features of their Data/Fax modems in a small card designed to fit snugly in the modem slot of your Mac Portable. Send faxes, collect your electronic mail or dial into the office network from any remote location. TravelModem is the ideal traveling companion for the Mac user on the go! Includes a free copy of MacKNOWLEDGE and a customized version of BackFAX. (modems) \$ 205.



Innovative Data Design

MacDraft	175.
I.S.I.	
Precision	155.
Strata	
StrataVision 3D	375.

COMMUNICATIONS & NETWORKING

CE Software

In/Out (1 to 5 Users)	128.
QuickMail 2.0 (1-10 Users)	249.
CompuServe	
CompuServe Navigator 3.0	39.
CompuServe Subscription Kit	24.
Connect Inc.	
MacNet	47.
DataVIZ	
MacLink Plus w/Cable 4.1	125.
MacLink Plus/Translators 4.1	109.
Dove	
FastNet SCSI	749.
FastNet III	375.
FastNet SE or SE/30	ea. 375.
Dow Jones	
News/Retrieval Membership	24.
Farallon	
Timbuktu 3.0	95.
Timbuktu Remote 1.0.1	125.
TrafficWatch	
PhoneNET PLUS	33.
PhoneNET Repeater	319.
PhoneNET Star Controller	839.
FreeSoft	
White Knight 11.0	89.
Hayes	
Smartcom II 3.1	85.
Infosphere	
Liaison	175.
InSignia Solutions	
Soft PC (Mac II)	245.

MetaComet

AccuWeather Forecaster	58.
Microcom Software	
Carbon Copy Mac	119.
Prodigy	
Mac Starter Kit	27.
Prometheus	
Acknowledge	289.
MacKNOWLEDGE	149.
Shiva	
NetBridge	339.
NetSerial X232	279.
Software Ventures	
Microphone II v.3.0	219.
TOPS	
NetPrint	119.
FlashBox	122.
FlashCard	155.
Repeater	122.
Teleconnectors	29.
TOPS 2.1A	159.
TOPS 3.0 Network Bundle	189.
TOPS DOS Network Bundle	165.
Traveling Software	
Lap Link	81.
Lap-Link III Connectivity Pac	114.
Lap-Link III Network Pac	189.

DATABASE SOFTWARE

Acius

4th Dimension 2.0	469.
AEC Management Systems	
AEC Information Manager	409.
Blyth	
Omnis 5	375.
Claris	
FileMaker II	219.
Fox Software	
FoxBASE+Mac	295.
Microsoft	
File 2.0	125.

Liaison

Liaison is the Eddy award winning software for connecting AppleTalk networks locally or remotely. Dial into AppleShare, MacServe or TOPS and access your E-mail anywhere, anytime. Offers exceptional flexibility, performance and network security. (networking) \$175.



HandOff

HandOff lets you open any document from the finder, even if its application is missing. You can specify a compatible substitute based on the document's creator or file-name extension, even across networks. Jean-Louis Gasse calls it "a nice, unobtrusive and very much needed extension to my Macintosh". (utility) \$32.



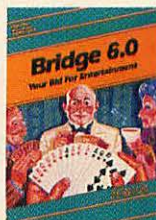
BASF 3.5" High Density Micro Diskettes

High 1.44 meg. capacity diskettes with no capacity for error. Every bit, every byte, on every track of each BASF 3.5" Micro Diskette is certified 100% error-free, manufacturer warranted for life. Made in the U.S.A. (blank media) \$24. Double Density (Box of 10) also available. \$14.



Bridge 6.0

Bridge 6.0 is a comprehensive contract or duplicate bridge - playing program which allows you and your computer partner to bid against two computer opponents and play out the hand. Ideal way for the novice to improve his or her game, and advanced player to get into a game without having to round up three additional players. (entertainment) \$24.



■ VISA and MASTERCARD accepted. No surcharge.	MWDG
■ Your credit card will not be charged until your order is shipped.	
■ If we must ship a partial order, we pay the freight on the remaining portion.	
■ All U.S. shipments are insured at no extra charge.	
■ C.O.D. orders accepted (add \$6.00 including shipping) — \$1,000 maximum. Cash, money order, or cashier's check.	
■ Corporate purchase order accepted subject to credit approval.	
■ All products are covered by a 120 day limited warranty.*	
■ Sales Tax: CT residents add 8%, NJ residents add 6%. Ohio residents add appropriate tax.	
SHIPPING	
■ All orders add \$3.00 per order. We ship Airborne Express overnight unless UPS Ground delivers overnight. (Some rural areas require an extra day.)	
■ Orders placed by 12:00 Midnight (EST) (weekdays) for "in stock" items ship same day (barring system failure, etc.) for overnight delivery.	
■ C.O.D. orders ship via UPS (Blue Label) if you are more than 2 days from us via UPS Ground. Charge is \$6 including shipping.	
■ Alaska, Hawaii, outside continental U.S., APO/FPO call 201-367-0440 for information.	

*Defective software replaced immediately. Hardware replaced or repaired at our discretion.

I'm Kerry, call me at:
1-800-255-6227
 (1-800-ALL-MACS) Now works in Canada.

Inquiries: 201-367-0440 Fax # 201-905-9279

MacWAREHOUSE™

1690 Oak Street, P.O. Box 1579,
 Lakewood, NJ 08701

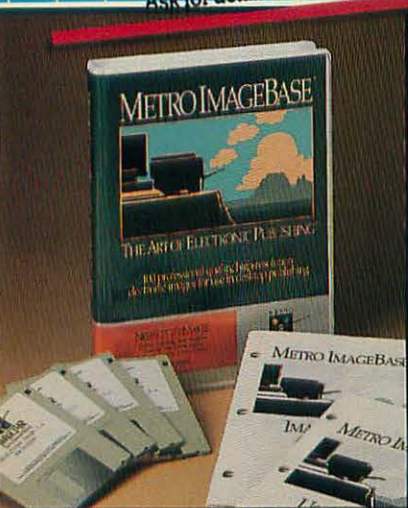
ORDER TOLL-FREE
24 HOURS A DAY



GUARANTEE

Many of our products come with a thirty day money back guarantee. If you are not completely satisfied. Ask for details when you place your order.

OVERNIGHT DELIVERY ONLY \$3.00



Metro ImageBase Electronic Art (Metro ImageBase)
High quality 300 dpi electronic art from one of the world's leading publishers of ready to use art. Enhance brochures, menus, reports, newsletters and presentations. One large image per file - 100 per package. Packages available: Newsletter Maker, Business Graphics, Computers & Technology, ReportMaker, Borders & Boxes and 9 others. (graphics) \$76. ea.

XOR/PCAI
Lunar Rescue or MacGolf 2.0 34.
MacGolf Classic 53.
Road Racer 39.
NFL Challenge 54.

FONTS

Adobe
Adobe Type Manager 56.
ATM Plus Pack 109.
Fonts (full line avail.) Call.
Forms and Schedules 279.
Newsletters 229.
Presentations 279.
Textures, Fills, and Patterns 129.

Altsys
Fontastic Plus 2.02 52.
Metamorphosis Call.
The Art Importer 2.0 89.

Emerald City Software
TypeAlign 60.
Letraset
LetraStudio 275.
LetraFonts (various) ea. 69.
Tactic Software
ArtFonts Vol.1, 2 or 3 ea. 55.
Orange Micro
Alphabits 69.

On Location (ON Technology)

There's no more need to be a super sleuth in order to find and view elusive files - with On Location it's elementary! Find a file by typing words it contains or any part of its name. Then instantly view the file with its original fonts and word-processing commands. Move copy, rename or delete files and more! (utility) \$75.

GRAPHICS & DESIGN

3G Graphics
Images w/Impact 52.
Graphics & Symbols 1 65.
Business 1 65.
Accents & Borders 1 65.

Adobe
Illustrator 88 1.9.3 279.
Photoshop 539.
Streamline 229.
Type Set 1 59.
Type Set 2 59.

Aldus
Freehand 2.0 339.
Aperture Technology
Aperture Visual Information Mgr. 729.
Broderbund
Drawing Table 75.
TypeStyler 119.

MacEnvelope 4.1 and MacEnvelope Plus (Synex)

Envelope and Label printing in one package! MacEnvelope 4.1 combines all of the features of envelope and label printing in one easy-to-use package. Import up to 1600 addresses per file. Unique Postal Bar Coding speeds delivery and saves money on postage (for bulk mailers). Over fifty preformatted ready-to-use label and envelope styles. Create/save layouts, print graphics, messages, fonts and color. \$79.
MacEnvelope Plus saves up to 100,000 addresses per file. Provides list management features such as comments, flags, multi-level sorting and print range. (business) \$149.

Casady & Greene
Vivid Impressions Vol. 1 67.
Claris
MacDraw II 295.
MacPaint 2.0 95.
Cricket (Computer Associates)
Cricket Color Paint 179.
Cricket Draw 139.
Deneba
Canvas 2.1 189.
Ultra Paint 125.
Digital Vision
Computer Eyes B&W 209.
Computer Eyes Pro Color 349.
Dream Maker
Cliptures, Business Images 69.
MacGallery 27.
Electronic Arts
Studio/1 96.
Studio/8 296.
Graphsoft
Blueprint 349.
Innovative Data Design
Dreams 325.
MacroMind
MacroMind Accelerator 129.
MacroMind Director 445.
VideoWorks II 175.



Utility Pac
Give Your Mouse a House! Save valuable desktop space. Store your Mouse, Mouse Pad and Diskettes conveniently on the side of any monitor. Platinum color. (accessories) \$11.

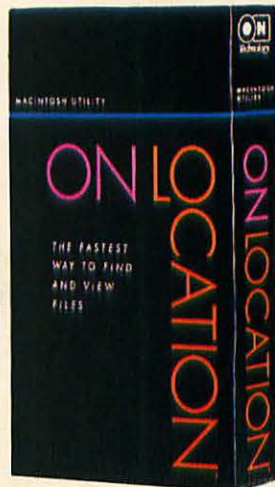
HardTops
You'll flip your lid over these durable covers! Protect keyboards from unexpected spills and falling objects with impact-resistant ABS plastic. By Basic Needs. Platinum color. (accessories) Starting at \$15.



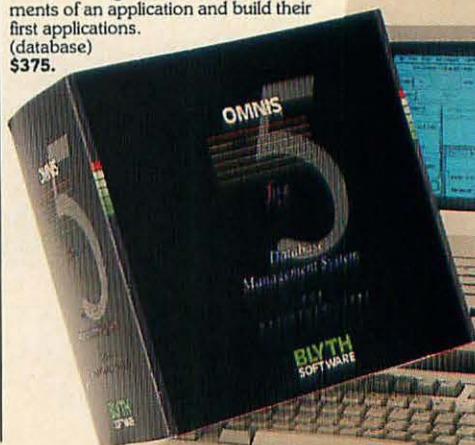
Address Book Plus
The most complete, ready-to-use solution for managing names, addresses, phone numbers, and other vital information. The program makes it easy to print top quality address book pages, phone lists, mailing labels, rotary-file cards, and envelopes. Also includes a separate Desk Accessory for searching and dialing. (business) \$53. With leather binder \$99.



Kraft Premium III Joystick
The button placement ensures fast action and comfortable use. Precision gimbals and dual-axis fine-tuners, give complete control over its operation. Connects to the ADB port of the Mac SE or Mac II (input/output) \$49.



Omni 5 (Blyth)
Omni 5 utilizes the graphical interface, enhanced memory, storage and color capabilities for both the Macintosh and IBM PS/2 hardware. It is designed to produce data files that can be shared between the Macintosh and IBM PC. Multi-user capabilities give simultaneous data access from both platforms. C/1 and SQL connectivity allows Omni 5 to access data from the VAX or IBM mainframe. HyperCard access is fully supported by Omni 5. Included is Omni 5 Express which allows the beginner to outline requirements of an application and build their first applications. (database) \$375.



MacWAREHOUSE 1-800-255-6227



Mac 101 Keyboards (DataDesk International)

Features 101 keys including a numeric keypad, a separate T-shaped cursor keypad, Cancel Key, Option and Command keys at both ends, definable function keys, plus scrolling, page control, and zooming keys. Manufacturer's two year warranty. (input/output) \$139. International Versions also available.



MacTilt

See eye to eye with your Mac and watch productivity soar! Raise your Mac to eye level using MacTilt's 4 inch pedestal. Then tilt it up to 30 degrees and rotate it a full 360 degrees to make glare, eye, neck and back strain disappear like magic. (accessories) \$68.



Endeavour Planner

Endeavour Planner puts you in charge of complicated projects. Its easy to use GANTT chart display lets you point, click and drag on any item. Each project can have its own calendar. You can adjust schedules midstream when conditions change, or lock in fixed deadlines. (business) \$95.



LapLink Mac III

Share Mac Brain Power! - Transfer/translate files easily. \$81.

LapLink Connectivity Pac includes cable/software for Mac-to-Mac/PC-to-Mac link-up. (2 Users) \$114.

LapLink Network Pac-link up to five Macs on an AppleTalk network. Both include hard disk password security, modem connections, split screen & more. (5 Users) \$189. (communications)

Metro ImageBase

(Full Line Available)

Art Deco or ReportMaker ea. 76.

Newsletter Maker or Business ea. 76.

Mindscape

ZING 125.

Multi Ad Services

Multi-Ad Creator 865.

ProArt: Bus., Sports or Holidays ea.95.

Paracomp

ModelShop 379.

Swivel 3D 1.1 299.

Silicon Beach

Digital Darkroom 249.

Super 3D 2.0 315.

SuperPaint 2.0 125.

Strata

StrataVISION 3d 375.

Strategic Mapping, Inc. (Select Micro)

Map Maker 4.0 245.



SuperMac

PixelPaint 2.0 225.

PixelPaint Professional 389.

Tactic Software

Art Clips Vol. 1 51.

Art Clips Vol. 2 65.

Zedcor

Deskpaint 2.0 64.

HARDWARE & PERIPHERALS

Cutting Edge

Two Page 19" Monochrome Monitor 959.

DEST

Dest PC Scan Plus SPECIAL 699.

General Computing Company

WriteMove Ink Jet Printer 575.

Magnavox

Color Monitor 14" 535.

Microtek

Microtek MSF-300GS Scanner 1589.

Mobius

Multiscreen Video Card w/ Princeton 15" monitor 529.

Qume

Crystal Print Publisher 2900.

Seikosha America

Seikosha Printer (dot-matrix) 235.

Sharp

The Wizard 229.

ThunderWare

LightningScan 369.

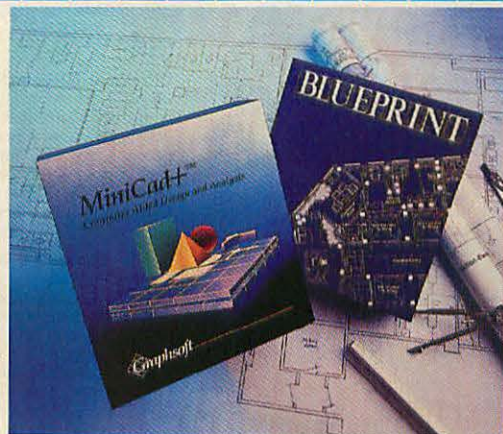
ThunderScan 5.0 187.

MiniCad+ 2.0 (Graphsoft)

This year MiniCad+ is the people's choice, winning both the U.S. and Australian MacWorld World Class Awards for CAD. For the price of most 2D CAD packages, MiniCad+ provides 2D, 3D, a hotlinked spreadsheet and a programming language. The quality is unsurpassed. (cad/cae) \$519

Blueprint

This new professional-level 2D CAD program has it all at an unbelievable price. Layers, fillets, DXF, constraint palette, high precision, auto-dimensioning, hatching, symbol library, encapsulated postscript plus more.(graphics) \$349.



HYPERWARE

Bantam

Complete HyperCard Handbook 22.

Beacon Technologies

HyperBible International Version 175.

HyperBible King James Version 145.

BrainPower

ArchiText 199.

Bright Star Technology

HyperAnimator 1.5.1 98.

interFACE 229.

DataDesk International

HyperDialer 29.

SmartOne 2400 Modem (Best Data Products)

For beginners and experienced modem users. If you need a 2400 baud modem, the Smart One 2400 Modem provides an economical alternative. For less than the cost of some 1200 bps units, you get a Hayes compatible modem with and auto answer/originate, 300, 1200 and 2400 baud operation, pass-through phone jack, speaker with programmable

volume, and a manufacturer's two-year warranty. All user options are stored in non-volatile memory. Includes software and cable. (modems) \$145.

ICOM Simulations

HyperTMON 59.

MicroMaps

HyperAtlas 59.

Power Up

HyperTutor 29.

Silicon Beach

SuperCard 125.

Softstream International

HyperHit 125.

Springboard

Family Matters 28.

Symmetry

HyperDA 1.2 49.

TimeWorks

HyperWorks Organizer 57.

INPUT/OUTPUT

Altra

Felix 127.

Asher Engineering

QuadLYNX Trackball 59.

Cutting Edge

CE-105 ADB Keyboard 125.

DataDesk Intl.

Mac 101 Keyboards 139.

International versions Call.

Kensington

New Turbo Mouse 109.

Koala

MacVision 2.0 219.

Kraft

ADB Joystick Premium III (SE&II) 49.

QuickStick

Trackball 39.

Kurta

IS/ADB Tablet 8 1/2 x 11 255.

Micro Touch

The UnMouse 189.

Mobius

Cordless Mouse 99.

Mouse Systems

A+ Mouse (SE&II) 79.

A+ Mouse (512/Plus) 59.

Practical Solutions

The Cordless Mouse 99.

Mouse Master

..... 57.

Summagraphics

Bit Pad Plus 319.

LANGUAGES

Digitalk, Inc.

Smalltalk/V MAC 125.

Microsoft

QuickBasic 65.

Shana Corporation

Inside Out 369.

SmethersBarnes

Prototyper 189.

Symantec

THINK'S C 4.0 165.

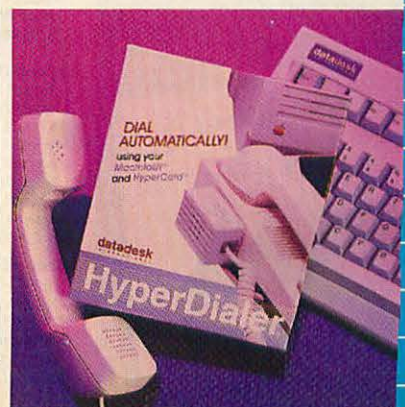
THINK'S Lightspeed Pascal 105.

Zedcor

ZBasic 5.0 89.

HyperDialer (DataDesk International)

Now you can connect your Macintosh to your existing business or home telephone for automatic dialing with Apple's HyperCard. DataDesk's HyperDialer is designed specifically for HyperCard's touch-tone dialing capabilities and works with-line business phones without requiring a modem or dedicated phone line for automatic dialing. Automatically dials HyperCard, SideKick, Focal Point, C.A.T., SuperCard and QuickDex phone numbers. It connects to Mac's speaker port - not a precious serial port. (hyperware) \$29.



OVERNIGHT DELIVERY
ONLY \$3.00
 (See details below)

GUARANTEE

Many of our products come with a thirty day money back guarantee. If you are not completely satisfied. Ask for details when you place your order.

UltraPaint (Deneba Software)

Michelangelo would turn Veronese green with envy! Combines B&W/color painting, gray scale image processing and object-oriented drawing. Supports 256 colors, a multi-color airbrush, editable mask & lasso, a water droplet tool and more. It's Open Architecture design makes adding features easy. (graphics) **\$125.**

Canvas 2.1 Unleash your creativity! Version 2.1, faster and more versatile than before, offers an unlimited number of object layers and full 16.7 million color support (256 colors per palette). Also offers enhanced Bezier curves, 100,000 word spell checker, improved alignment manager, a four-color process separations utility, and more. Directly import MacDraw II and export EPS formatted files. (graphics) **\$189.**

Supra
 Supra Modem 2400 129.
US Robotics
 Courier 9600 Modem 689.

MacGolf Classic (XOR Corp.)

You won't be in the rough when you play MacGolf. This premium edition of MacGolf features vivid full-screen color graphics with unsurpassed screen image detail. Contains the original 2 MacGolf courses and 4 additional MacCourses, for a total of 108 holes to play. New features include 5 enlargement options for close-up viewing, 9 practice greens, a driving range, installability on hard disks and much more. Works with Plus, SE, II and IICx. (enter.) **\$53.**

HIP Software
 Harmony Grid 59.
Intelligent Music
 OvalTune 95.
Passport Designs
 NoteWriter 325.
 Passport MIDI Interface 89.
Primera Software
 Different Drummer 59.
Repertoire
 Music Publisher 359.
Resonate
 Listen 2.0 62.
Tactic Software
 Sound Clips Vol. 1 or 2 ea. 49.

MEMORY UPGRADES/ACCELERATORS

1 MEG SIMMS
 Low Profile, 120ns High Quality
 Single In-Line Memory Modules
 for MacPlus, SE, II, IICx.
 2 yr. Warranty. **New low price \$89.**

Dove (full line available)
 MaraThon 030 Accelerator 969.
 MaraThon 030X 969.
 MaraThon Racer 149.
 MacSnap 2S 199.
 MacSnap 4S 395.
 MacSnap 8S 818.
 MacSnap 524E 185.
 MacSnap 524S 239.
 MacSnap 548S 499.

MODEMS/FAX

Abaton
 InterFax12/48 265.
 InterFax 24/96 425.
Best Data Products
 SmartOne 2400/1200 145.
Hayes
 Smartmodem 1200 295.
 Smartmodem 2400 429.
 Smartmodem 9600 (V series) 759.
Prometheus
 ProModem 2400 SE Int. 209.
 ProModem 2400M 199.
 Travel Modem 205.

MUSIC AND SOUND

Altech
 MIDI Interface 59.
Bogas Productions
 Super Studio Session 2.0 65.
Coda
 Finale 589.
 MacDrums 31.
 Perceive 49.
Electronic Arts
 Deluxe Music Construction 2.5 85.
 Deluxe Recorder 99.
Esthetic Engineering
 Music Mouse 49.
Farallon Computing
 MacRecorder (records sound) 164.
 Screen Recorder 125.
First Byte
 SmoothTalker 33.
Great Wave
 Concertware+MIDI 5.0 99.

HyperBible (Beacon Technology)

Old and New Testament Bible quotations are easily accessed and brought to life with this amazing Bible study system. Use HyperBible's extensive historical data to trace the development of people and places described. 15MB hard disk space required. Includes HyperCard 1.2.2. (hyperware) New Int'l. Version **\$175.** King James Version **\$145.**

Gems of the Word

These Little Gems are Priceless! Put your day into perspective with up to 2,000 inspirational Bible verses. Covers over 150 topics. Gem of the Day program offers a new verse each day. 800k. (educational/personal) **\$25.**

PixelPaint Professional 2.0 (SuperMac Technology)

PixelPaint Professional's photo-realistic paint capabilities let your imagination tinker with reality. Don't settle for manipulating images...create them with PixelPaint Professional! Offers an array of advanced paint tools for dazzling special effects. Choose from full transparency control, dynamic masking, image merging and a sophisticated airbrush tool. Use 8-to-32 bit color while selecting from a spectrum of custom

palettes and color pickers including 4-color process, RGB, and PANTONE. (graphics) **\$389.**

SECURITY & VIRUS PROTECTION

ASD Software, Inc.
 FileGuard 125.
 FileGuard Extend (office 5-pak) 309.
TWINS
 Fifth Generation
 Disk Lock 107.
Kent Marsh
 MacSafe II 107.
 NightWatch 86.
 QuickLock 56.
Mainstay
 AntiToxin 59.
Microcom
 Virex 2.2 52.
Symantec Corporation
 S. A. M. 69.

SPELLING/Dictionary THESAURUS CHECKERS

Deneba Software
 BigThesaurus 59.
 Spelling Coach Pro 3.1 125.
Electronic Arts
 Thunder II 49.
Lexpertise
 MacProof 3.2.1 115.
Microlytics
 Electronic Word Finder 69.
 Word Finder 2.0 34.
Sensible Software
 BookEnds 53.
 Sensible Grammar 51.

STATISTICAL ANALYSIS

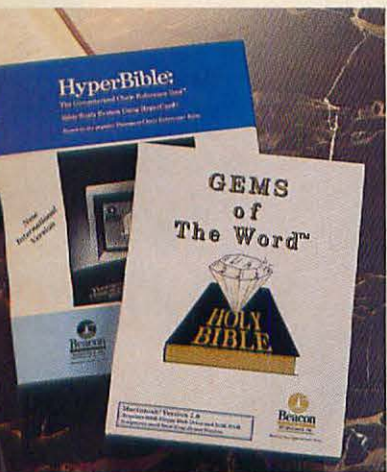
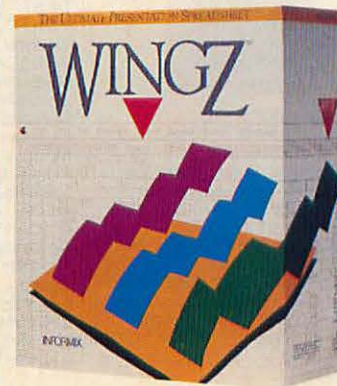
Abacus Concepts
 StatView II 285.
 StatView SE+Graphics 199.
BrainPower
 StatView 512+ (requires 512k) 149.
D2 Software
 MacSpin 2.0 189.
Odesta
 Data Desk 3.0 349.
Paracomp
 Milo 159.
Select Micro Systems, Inc.
 Exstatix 219.
Wolfram Research
 Mathematica (SE) 450.

UTILITIES

Abbott Systems
 CanOpener 1.1 65.
Affinity
 Tempo II 75.
Aladdin Systems Inc.
 Programmer's Assistants 75.
 Shortcut 46.

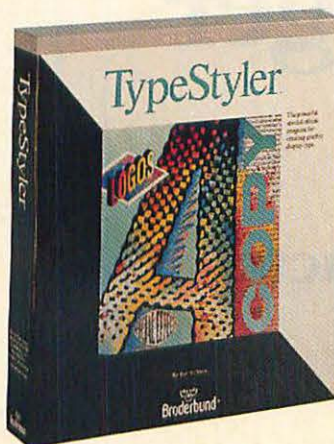
WingZ 1.1 (Informix Software)

With WingZ, the largest, fastest and most versatile spreadsheet for any Macintosh you can combine numbers, words and graphs on a single page. Ver. 1.1 of WingZ has completely new documentation including a 525-page HyperScript volume, new features, enhanced 3-D graphs, expanded capabilities in WingZ HyperScript development language and much more. (business) **\$249.**



CompuServe™

You can now contact MacWAREHOUSE or place orders with us in the Electronic Mail on CompuServe. The MacWAREHOUSE GO code GO MW. As always, you'll get fast, dependable overnight service and you can leave messages for Kerry or any of our support staff.



TypeStyler (Broderbund)

Take an ordinary message - then bend it, shape it, anyway you want it! With TypeStyler you'll create dramatic graphics without expensive typesetting. Type it - then Style it using an array of unique paint features. Feel free to import and export PICT, Paint and EPS file formats, export Adobe Illustrator outlines and more. TypeStyler comes with 10 AGFA Compugraphic typefaces and works with thousands of fonts including Type I from Adobe. Next time say it with style... Say It With TypeStyler! (graphics) \$119.

ALSoft

DiskExpress II Call.
Font/DA Juggler 42.
MultiDisk 49.
Master Juggler 64.

Berkeley System Design, Inc.

Stepping Out II 50.

CE Software

DiskTop 4.0 64.

QuickKeys 1.2 64.

Caere 549.

OmniPage 549.

Central Point Software

Copy II Mac 24.

Mac Tools 45.

Custom Applications

Freedom of Press 2.1a 265.

Dantz Development

Retrospect 152.

Dayna Communications

DOS Mounter 55.

Emerald City Software

Lasertalk 1.0 149.

Fifth Generation

FastBack II 107.

PowerStation 2.5 34.

Pyro 14.

Suitcase II 44.

GO Technology

MacTree Plus 46.

ICOM Simulations

On Cue 35.

Insight Development

MacPrint 95.

Magic Software

AutoSave II 29.

BackMatic 50.

POWERIcons or POWERMenus ea. 39.

Mainstay

Capture 2.0 49.

Microlytics

GOfer 45.

Olduvai

ClipShare 139.

MultiClip 50.

ON Technology

On Location 75.

PCPC

HFS Backup 3.0 54.

Peripheral Land, Inc.

TurboBack 55.

TurboCache or Turbo Spool ea. 69.

TurboOptimizer 39.

Preferred Publishers

Exposure 52.

Software Innovations

HandOff 32.

SuperMac

DiskFit 1.5 or SuperSpool 5.0 58.

Sentinel 2.2 87.

SuperLaserSpool 2.0 (single user) 87.

SuperLaserSpool (5-pack) 289.

Symantec Corporation

SUM II 99.

Tactic Software

FontShare 2.0 149.

Icon-It 2.0 39.

Williams & Macias

DiskFinder 27.

myDiskLabeler 33.

StickyBusiness 1.07 89.

XTree Company

XTree Mac 52.

WORD PROCESSORS & OUTLINERS

Ashton-Tate

FullWrite Professional 259.

Claris

MacWrite II 169.

DeltaPoint, Inc.

MindWrite 2.1 95.



Read-It! OCR 2.1 (Olduvai)

Use any scanner to input pages of text as graphics. Then Read-It! works interpreting those graphic images as ASCII characters. Handles forms filled in by typewriter, which can speed up many typical office operations. For every typeface, you'll have to teach it the alphabet, and afterwards, you'll want to run the output through a spelling checker. But think of the time you'll save when you don't have to type bulk text into your Mac. (desktop publishing) \$245.

Microsoft

Word 4.0 249.

New Horizons Software

WordMaker 65.

Niles & Associates

End Note 75.

Symmetry

Acta Advantage w/DA 65.

TMaker

WriteNow 2.0 119.

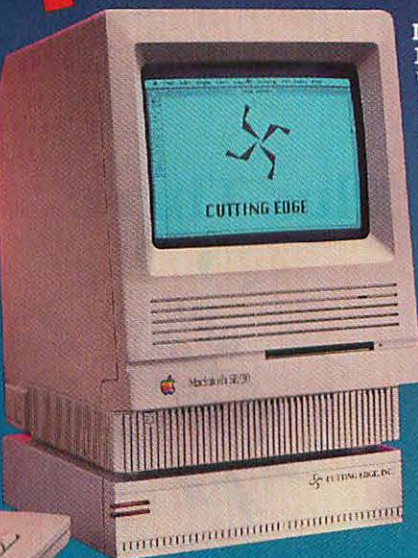
WordPerfect Corp.

WordPerfect 229.

Working Software

QuickLetter 73.

STOP PRESS



NEW!

Price breakthrough! Under the Mac Drives (Cutting Edge)

The Cutting Edge Under the Mac hard disk drives are quiet and reliable with access times down to 20 ms making it almost three times faster than most. Push button external SCSI address switch and removable SCSI terminators allow easy daisy chaining up to 7 SCSI devices. Sizes available 20 meg to 80 meg (see line listings)

20 meg only \$359.
30+ meg only \$439.
45+ meg only \$499.
60+ meg only \$599.
80+ meg only \$659.

800K Drive

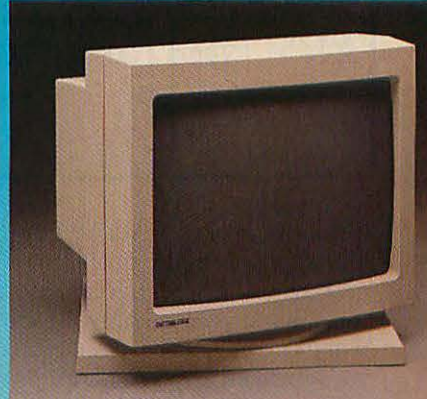
The Cutting Edge 800K Drive's attractive styling, quiet performance, and high-tech reliability make it our most popular floppy drive.

Features an LED light to indicate disk access and a hinged door over the disk insertion slot to keep the mechanism clean. One year manufacturer's warranty. (disk drives) \$149.



Two Page 19" Monochrome Monitor (Cutting Edge)

Every Mac SE and II user can now justify the expense of a big screen with the new Cutting Edge 19" Two Page Monochrome Display System. The Cutting Edge Monitor includes the interface card and matches just about all the features of other big screen display systems costing twice as much. It has a flicker-free refresh rate of 70 hz and a high resolution of 72 DPI. Like all Cutting Edge products it comes with a one year warranty and a 30 day money back guarantee. Please specify your Mac model. (hardware) \$959.



I'm Donna, call me at

MacWAREHOUSE™

1-800-255-6227

Inquiries: 201-367-0440

FAX: 201-905-9279

ORDER TOLL-FREE

24 HOURS A DAY.



CONTEST RULES 1. Entries must be received on or before 4/30/90. 2. Winners selected in random drawings by attorneys for MicroWarehouse Inc. (MWH), whose decisions are final. 3. Mac Portable Computer prize subject to availability. MWH reserves the right to substitute wholesale cash value up to \$5,000. 4. Winners responsible for taxes. 5. Odds of winning depend on number of entries. All prizes will be awarded. 6. MWH will announce the winners on or around 5/31/90. Winners notified by mail. Dates subject to change at the discretion of MWH. If unable to contact any winner, an alternate will be selected by random drawing. 7. Contest is open to US residents, except where prohibited by law. Employees of MWH and suppliers not eligible. 8. Prizes - one Mac Portable Computer w/40MB hard disk and 150 software and media prizes.

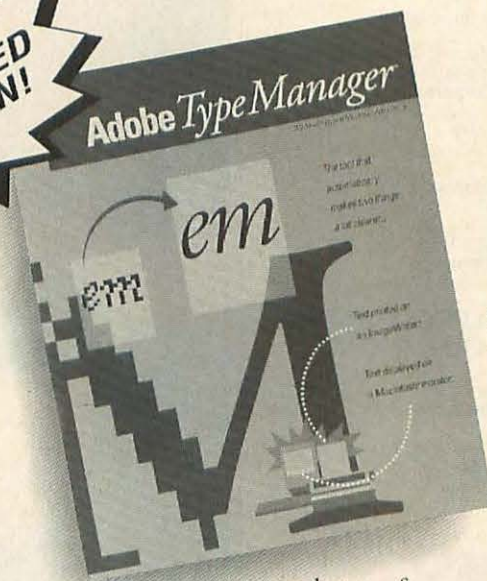
Circle 78 on reader service card

Introducing the New, Improved Adobe Type Manager \$59.

Plus Three *New* Adobe Products*!

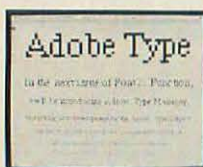
**NEW
IMPROVED
VERSION!**

Now you can get the **new edition** of Adobe Type Manager from MacWarehouse. You'll greatly improve the output of your ImageWriter or Hewlett-Packard DeskWriter and make your Macintosh display text smoother and more legible than before. But don't stand in line to pay \$99 at your local software store. Pick up the phone now, and for just \$59 (plus \$3 s&h), we'll rush your copy by overnight delivery!



save megabytes of space on your hard disk. You won't need any additional memory, either.

If you have a non-PostScript laser printer, like Apple's LaserWriter IISC, Adobe Type Manager will give you PostScript-quality type, without the PostScript expense. And Type Manager includes high quality outline versions of 13 popular fonts, so it's easy to produce the kind of text you thought only came from a PostScript laser printer.



Believe it or not, Adobe Type Manager solves the problem of jagged edges on screen fonts, too. Now, what you see on your screen will more closely resemble what you get from any PostScript printer — no more 24-point headlines that look like brick piles on screen. It's almost like having Display PostScript on your Mac — for only \$59.

Adobe Type Manager is compatible with virtually every major application, and it's easy to install on any Mac (running System 6 or later) from a Plus to a IIci. Just a few clicks with your mouse — install it and forget it. Because you'll only need one size of a screen font installed in your System, you can also



Our friendly MacWarehouse staff of Mac fanatics is standing by to help with any questions you may have. Remember, nobody beats our fast, dependable, overnight service for Adobe Type Manager or any of the other fine Adobe products.

NEW!

■ **Adobe Plus Pack** — Contains 22 additional typefaces — Adobe Typeface Packages 1-5 and Helvetica Narrow. (These are not included with Adobe Type Manager.) The MacWAREHOUSE low price is just **\$109!**

■ **Adobe Type Set 1** — Contains 7 typefaces. The MacWAREHOUSE low price is just **\$59!**

■ **Adobe Type Set 2** — Contains 7 typefaces. The MacWAREHOUSE low price is just **\$59!**

ADOBE TYPE SET 1	ADOBE TYPE SET 2
Hobo	Peignor Demi
Bodoni	Present Script
Poster	Cooper Black
Freestyle Script	Franklin Gothic
VAG Rounded	No. 2 Roman
Bold	COPPERPLATE
Linotext	GOthic 31AB
COTTONWOOD	LITHOS BOLD
TRAJAN	JUNIPER

*Designed for use with Adobe Type Manager — sold separately.

MacWAREHOUSE™
1-800-255-6227

24 hours a day, 7 days a week.

Inquiries: 1-201-367-0440

Fax: 1-201-905-9279

© 1990 Micro Warehouse Inc.

MWD08

connectors; some have a life rating of only 100 mating cycles.

I replaced the connectors in my Apple extended keyboard by simply removing the four screws on the bottom of the keyboard and then lifting off the top of the keyboard. The small printed circuit boards with the connectors mounted on them are then easily accessible.

Larry Junek
Schertz, Texas

Quit the Finder

TIP: Having trouble using MultiFinder on a 1MB Mac, or just want to buy yourself a couple hundred K when using MultiFinder? It's easy—quit the Finder. The Finder doesn't have a Quit command, but using ResEdit you can designate an F-key (function key) that

acts like one. You use an F-key by pressing ⌘ -Shift and a number. For example, ⌘ -Shift-1 ejects a floppy disk.

Start by making a backup copy of the Finder (press Option while dragging the Finder icon from the System Folder to another folder or disk). Use ResEdit to open your copy of the Finder. Choose New from ResEdit's File menu. In the dialog box that appears, type in capital letters FKEY and click on OK. Again choose New from the File menu. In the window that opens, type A9F4. Next choose Get Info from ResEdit's File menu. In the dialog box that appears, change the number labeled ID to 0 or a number between 5 and 9. Quit ResEdit, answering Yes when it asks if you want to save changes to the Finder. Finally, open the System Folder, drag the


Finder from it to the desktop, and drag your modified copy of the Finder to the System Folder. (Your modified Finder must be named Finder.)

To use the F-key, you must first activate MultiFinder using the Finder's Set Startup command (located on the Special menu) and restart the Mac. Then Open any application or desk accessory, switch to the Finder, and press ⌘ -Shift together with the 1-digit number you assigned as the ID in ResEdit. Notice the disk and Trash icons disappear. Check the Apple menu—Finder is not open!

Peter Ford, George Weil, and
Randy Zeitman
Address unknown

You'll also need to quit the application you opened before quitting the Finder. Otherwise the regained memory can only be used to open an application that needs no more memory than the Finder. Normally the Finder uses 160K. You can increase that amount by changing the Application Memory Size option (using the Finder's Get Info command) and then restarting.

With no Finder, you'll need an alternate method of opening applications. On Cue from ICOM Simulations (312/520-4440) adds a customizable application menu to either end of the menu bar. DiskTop from CE Software (515/224-1995) is a DA with all the functionality of the Finder (and more) but with a different interface.

The latest version of ResEdit, 1.2 at this writing, is available with documentation from APDA (408/562-3910, 800/282-2732 in the U.S., 800/637-0029 in Canada.)—L.P. 

.....
We pay from \$25 to \$100 for tips published here. Send tips or questions (with your address and phone number) to *Quick Tips*, Macworld, 501 Second St., San Francisco, CA 94107. Send electronic mail to CompuServe (70370,702) or MCI Mail (addressed to 294-8078). All published submissions become the property of Macworld.

Lon Poole answers readers' questions and selects their tips for this monthly column. He has written many personal computer books, most recently the quick reference guide HyperTalk (Microsoft Press, 1988), and has just finished a new book of Mac tips (to be published this summer by Microsoft Press), Amazing Mac Facts.

{Define the}	{gray scales—in}	{loop through each}
{variables needed}	{this case 16}	{Z axis division.}
{for the script}	DEFINE number	{assigning the}
		{next gray value}
		{to that division}
{“chartnum” holds}	number = 16	FOR iterator =
{the number that}		1 TO number
{refers to the}	{turn repaint off}	
{selected chart}	{so that the graph}	
DEFINE chartnum	{is not redrawn}	{calculate the}
	{after each}	{RGB values}
{“min” is the}	{command}	{needed for}
{default minimum}	REPAINT OFF	{this gray}
{value assigned}		{level}
{to the chart}	{get the number}	colorvalue =
DEFINE min	{of the selected}	iterator*255
	{chart}	/number
	chartnum=NUMBER()	
{“max” is the}		{select that}
{default maximum}	{select that}	{Z axis}
{value assigned}	{charts Z axis}	{division}
{to the chart}	SELECT CHART	SELECT CHART
DEFINE max	chartnum AXIS 3	chartnum
		SERIES
{“iterator” is}		iterator
{the loop counter}	{get the present}	
DEFINE iterator	{Z axis scaling}	
	min=SCALEMINIMUM()	{assign the}
	max=SCALEMAXIMUM()	{proper RGB}
{“colorvalue” is}		{values}
{assigned to each}		FILL FG RGB
{RGB component}	{set the Z axis}	(colorvalue,
{to produce the}	{scaling and}	colorvalue,
{smoothly varying}	{number of major}	colorvalue)
{grays}	{divisions}	
DEFINE colorvalue	MANUAL SCALING	
	FROM min TO max	{end loop}
	WITH	END FOR
{“number” is the}	number MAJOR AND	
{number of Z axis}	1 MINOR DIVISIONS	{now redraw the}
{divisions and}		{graph}
{corresponding}		REPAINT OBJECTS

Smooth Variations

This Wingz script smoothly shades a surface or contour graph. The script remaps the z axis to have 16 divisions, and makes each division a lighter shade of gray than the division below it.

ITS SPEED IS FEROCIOUS. ITS VERSATILITY, UNPRECEDENTED. IT'S UTTERLY PRECISE, ASTONISHINGLY NIMBLE, & INCREDIBLY SMOOTH AT THE HELM. THE PLANE'S NOT TOO SHABBY EITHER.



BEST
GRAPHICS
PROGRAM

It's no accident that the high performance of Canvas™ evokes images of a jet fighter in full flight.

Fact is, its technical drawing power renders Canvas remarkably adept at evoking almost any kind of image you could want.

Over time, this has served to render Canvas's competitors rather speechless. And its reviewers, just the opposite.

A quick tour of its amazing arsenal of weapons helps explain why all the commotion.

Advanced Bezier and spline curves with total editing control. 64,000 dpi accuracy. 16 million-plus colors. Custom rulers, dashed lines, and arrowhead styles. 1/1,000th inch hairlines. Auto object distribution and dimensioning of lines & arcs. Auto tracing of scanned art.

Press-ready 4-color (CMYK) separations, with precision screen angle adjustments and independent color overrides. Flexible EPSF export formats. Importing of MacDraw® I or II files. Smooth text handling and

a 100,000 word onboard spell checker.

The list just goes on. And on. And on.

Yet despite all this technical prowess, Canvas has earned consistent applause for its intuitive design & ease of use.

And, perhaps best of all, for its list price of under \$300.

So, if you're looking for a lot more thrill and a lot less limitation, look into Canvas.

By any measure, it's the only way to fly.

TRADE UP FOR JUST \$99.

It's also no accident that Canvas reads MacDraw® files. We like to think of this as a no-loss invitation to greatness. Simply mail your MacDraw® I or II Master Disk and \$99 (check or full credit card info) to Deneba Software, 3305 N.W. 74th Ave., Miami, FL 33122. Offer expires 5/31/90.

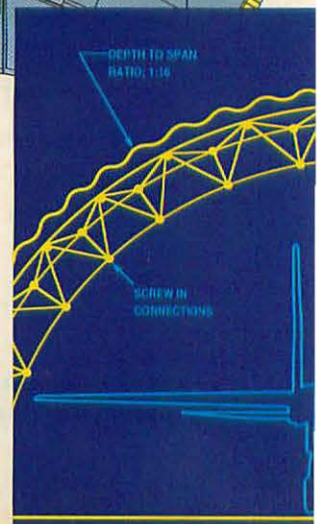
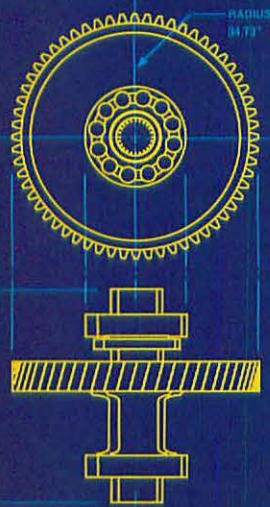
For additional information or the name of your nearest dealer call 1 (800) 6-CANVAS or (305) 594-6965.

©1990 Deneba Systems, Inc. Canvas™ is a trademark of Deneba Systems, Inc. MacDraw® is a registered trademark of Claris Corporation.

All illustrations were created in Canvas and separated by the Canvas Separator.™

CANVAS™
PRECISION DRAWING POWER FROM
Deneba SOFTWARE

Circle 346 on reader service card





Getting Started with Memory

HOW MEMORY WORKS, AND HOW TO MAKE IT WORK BETTER FOR YOU

BY JIM HEID

In 1946 at a lecture at the Los Alamos National Laboratory, a mathematician named John von Neumann presented his vision of future computers: they would contain internal storage space for holding the results of calculations until the data

could be permanently stored on punched cards. This temporary work space, which he called *internal memory*, would also allow a computer to hold sequences of instructions, eliminating the need to rewire the machine to perform a different type of calculation. Yes, in that computer Stone Age, to run a different program, you got out your wire cutters.

Since those early days memory has evolved from room-size circuits that could store a sentence to fingernail-size chips that can store a book. And someone reading this 20 years from now will probably chuckle at my quaint descriptions of today's memory. But it's likely that memory will still serve the same basic role: storing the programs we use and the data we create. This month, I'll look at this role as it applies to the Mac, and I'll describe ways to use memory to improve the Mac's performance.

Memory Minutiae

There are many types of memory, but most fall into either of two broad categories: *ROM* and *RAM*. You can't venture into the Mac world without encountering these two acronyms, so it helps to understand the concepts behind them.

ROM stands for *read-only memory*: the Mac can read the contents of a ROM chip, but it can't change them. A ROM chip's software is in there for good, frozen at the factory like the grooves on a phonograph album. The only real threat it faces is an electrical mishap such as a power surge or a spark of static electricity.

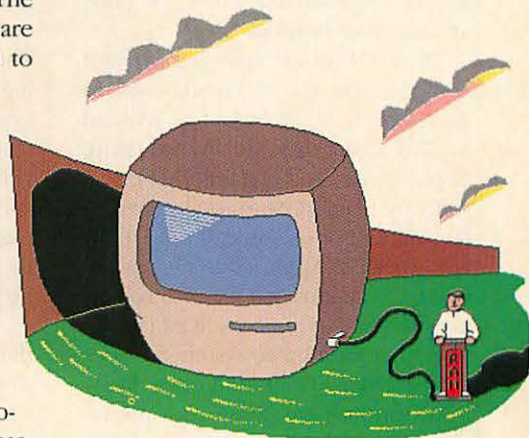
In the Mac, ROM chips store portions of the fundamental *system software* that enables the Mac to run. The Mac's ROM contains small software routines that applications call on to create pull-down menus, dialog boxes, and the other visual elements of the Mac's interface. (These routines are often collectively described as the *Toolbox*.) ROM also stores small diagnostic routines that swing into action when you switch the Mac on, testing its hardware for problems and then displaying the familiar where's-the-disk? icon.

If a ROM chip is like a phonograph album, a RAM chip is like a cassette tape or a disk—it's initially blank, and its contents can be changed over and over again. RAM stands for *random-access memory*. Because it can be written to as well as read from, it's sometimes called *read-write memory*.

RAM is versatile but vulnerable. Cassettes and disks store information using magnetic particles oriented in patterns that remain intact until another magnetic field comes along to change them. A RAM chip, on the other hand, uses millions of microscopic electronic switches that stay in place only as long as the chips have a steady, reliable supply of power. That's why programs have Save commands—and why it's a good idea to use them often.

Incidentally, RAM chips are often referred to as *DRAM* (pronounced *dee-RAM*) chips. *D* is for *dynamic* and reflects the chip's need for a periodic electronic nudging, or *refresh signal*, that allows it

to retain its contents. The other major type of RAM chip, *static RAM*, doesn't require a refresh signal and therefore uses less power. That's one reason Apple used (continues)



static RAM in the Mac Portable. But static RAM chips are more expensive than their dynamic counterparts; as a result, most deskbound computers use DRAM chips.

The RAM chips used in deskbound Macs are connected in groups of eight on small plug-in circuit boards called *Single Inline Memory Modules*, or *SIMMs*. (The Mac Portable uses its own specialized memory boards, and in the discontinued 128K and 512K Macs, RAM chips are connected directly to the computer's main circuit board.) In their least-expensive configuration, all currently manufactured Macs include 1 megabyte (MB) of RAM. One megabyte was a vast expanse in John von Neumann's computing world, but as we'll see shortly, today it's barely enough.

"Coming to Terms with Memory" defines the most common memory-related terms. For details on choosing and installing specific upgrades, see "Is Your Mac Obsolete?" (February 1990).

Cramped RAM

The Mac's RAM and ROM chips work together—ROM supplies the carved-in-stone software that helps the Mac run, and RAM provides the storage space to hold, well, everything else. You might think the Mac's RAM holds only applications and their documents. Not so. RAM is like a shared closet—it's crammed with odds and ends that reduce the amount of space left over for your stuff. These odds and ends include the following.

- **RAM-based system software**

Some of the Mac's system software isn't frozen in ROM but is instead loaded from disk during start-up. Apple omitted some of this RAM-based software from ROM in the interest of flexibility. (For example, if the Finder was in ROM, Apple couldn't release updated versions of it without requiring everyone to buy new ROM chips.)

Other RAM-based system routines bypass older ROM-based ones. Many ROM routines are designed to be replaced by newer ones, called *patches*, that load into RAM during start-up. A patch might fix a bug discovered in a ROM routine, or it might add new ROM-based features to an older Mac—for example, Apple's 32-bit QuickDraw software, which lets color Macs use

the latest color video hardware (see *Macworld News*, August 1989). The IICI has 32-bit QuickDraw software in ROM, but other Mac IIs that don't have it need the patch. The price for this interface lift? About 80K of RAM.

- **Start-up documents (INITs)**

These ubiquitous programs load during start-up and let you customize keyboard shortcuts, exchange electronic mail, and more (see "Start with Utilities," *Macworld*, October 1989, and "Getting Started with Utilities," February 1990). They're an effective way to customize and enhance the Mac, but they take their toll on free RAM.

- **MultiFinder** System software that lets you run multiple programs simultaneously. It requires 160K of RAM—enough to accommodate an array of INITs or to help feed a memory-hungry program.

- **The RAM cache** This Control Panel option can boost performance, but it uses RAM to do so.

The upshot of all this is that a 1MB Mac doesn't have 1MB of *free* mem-

ory; instead, it has only 600K to 700K—less if you use MultiFinder or memory-consuming INITs such as network or electronic-mail software. If yours is a 1MB Mac, you'll need to do some careful tweaking to get acceptable performance, and you should choose programs that use memory sparingly. For survival strategies for 1MB machines, see "More for Your Memory," in this issue.

Ramming Speed

By boosting the Mac's memory, you can take full advantage of MultiFinder's talents by running several programs at the same time and switching among them with a mouse click. You can also use extra memory to speed up the Mac's operation.

Extra memory can boost performance by reducing the need for the Mac to access both hard and floppy disks. When a program's code or data is stashed in memory instead of on disk, data transfers occur much faster than (*continues*)

COMING TO TERMS WITH MEMORY

Access Time The time required, in nanoseconds (billionths of a second; abbreviated *ns*) to successfully read to or write from a RAM chip. Some Macs require faster RAM chips than others; the IICI needs 80ns RAM chips, while the Plus and SE can use slower chips. (Some static RAM chips provide access times as fast as 25ns.) You can use chips with a faster access time than your Mac needs, but they won't speed up processing; the computer's circuitry is designed for chips with a specific access time.

Bit Short for *binary digit*, the smallest unit of computer storage. A bit can represent one of two states: 1 (on) or 0 (off).

Byte The workhorse of information storage, equal to 8 bits. One byte can represent any of 256 values, since its 8 bits can be on or off in 256 different combinations. A byte can represent a single character; for example, storing the alphabet requires 26 bytes.

Density The capacity, in bits (not bytes), of an individual RAM or ROM chip. The most common densities are 256 kilobits and 1 megabit. By tying RAM chips together in groups of eight, a SIMM board can store 256 kilobytes or 1 megabyte. A 1MB Mac contains four 256K SIMMs; a 4MB Mac has four 1MB SIMMs.

Gigabyte 1024 megabytes; abbreviated as *GB*.

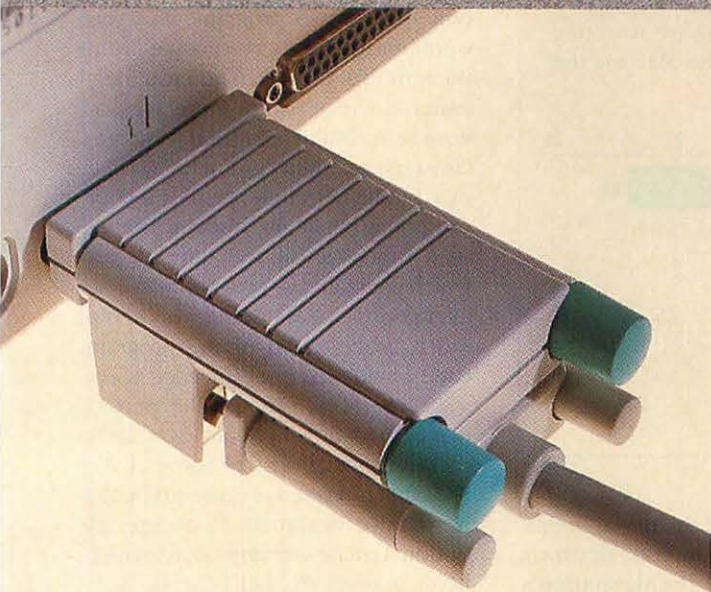
Kilobit 1024 bits; abbreviated as *Kbit*. The capacities of individual RAM chips are measured in Kbits.

Kilobyte 1024 bytes; abbreviated as *K*.

Megabit 1,048,576 bits; abbreviated as *Mbit*.

Megabyte 1024 kilobytes, or 1,048,576 bytes; abbreviated as *MB*.

Your old Macintosh can learn new tricks if given half a chance.



half a chance.

Rapport

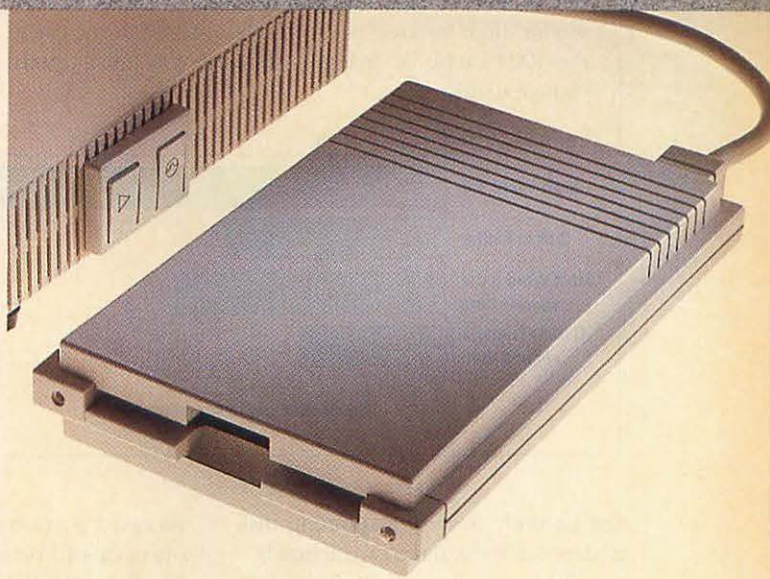
- Lowest cost 720K MS-DOS data exchange
- Upgrades 512e, Plus & SE to SWIM™ capability
- Use with Drive 2.4, Apple 800K & Super Drive™
- Cuts number of back-up diskettes by 1/3

Don't be left behind by Apple's new Mac disk standard. Rapport provides the processing power to connect "super" 3.5" floppy drives and more.

The Rapport module also enables Mac to read 720K MS-DOS, OS/2, and 800K ProDOS disks with the internal 800K drive. Rapport with an external Apple 800K drive can read and write those alien formats. For back-up, Rapport can increase disk capacity to 1.2Mbytes using 800K diskettes.

See Us At Booth 5603 Macworld Expo San Francisco-Brooks Hall

For the dealer nearest you, call: 1-800/552-1232 or Inside California 408/370-2866
120-A Albright Way, Los Gatos, CA 95030 FAX: 408/370-0484 Link: D2997

KENNECT and RAPPORT are trademarks of KENNECT TECHNOLOGY. Apple, Macintosh, 512e, Plus, SE, Super Drive, SWIM and ProDOS are trademarks of Apple Computer, Inc. MS-DOS is a trademark of Microsoft Corp. FASTBACK II is a trademark of Fifth Generation Systems, Inc. IBM is a trademark of IBM Corp.

the other half.

Drive 2.4

- Supports all Apple & IBM 3.5" Formats
- Lowest Cost/Highest Performance HD Drive
- Fastback II Backup Software Included
- Back-up 20Mbyte with 5 or 6 HD diskettes

Rapport's other half, Drive 2.4 takes you beyond Apple's "state of the art" High Density floppy drive. In addition to supporting *all* current 3.5" disk formats by Apple and IBM, Kennect's Drive 2.4 supports two new Very High Density formats which furnish 1.2Mbyte user space on standard density media and 2.4Mbyte on High Density diskettes – up to 4Mbyte using the *included* FASTBACK II utility.

One Drive does it all – Quite a trick.

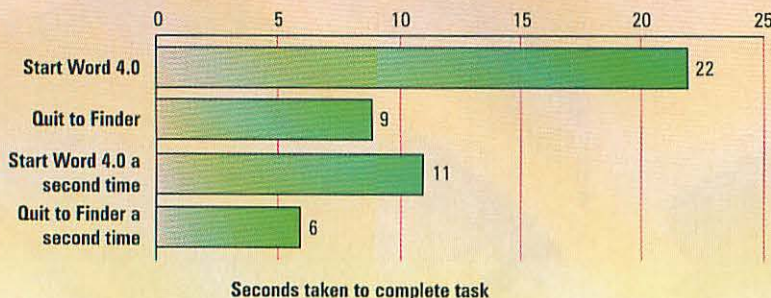


KENNECT™
TECHNOLOGY

Circle 503 on reader service card

FAST CACHE

By activating the Control Panel's RAM cache option (top), you set aside memory (up to 25 percent of the total RAM) that the Mac uses to hold recently loaded program code and data. If that code or data is needed again, the cache supplies it, eliminating a relatively slow disk access. The chart (bottom) shows how a 256K cache improves performance on a 1MB Mac SE without a hard disk. It takes less time to start Word 4.0 and quit to the Finder a second time because part of each is stored in the cache. (After activating the RAM cache or changing its size, you must restart the Mac for the change to take effect.)



the leisurely pace of a spinning disk and its mechanical read-write heads.

There are three techniques you can use to improve performance by reducing disk accesses:

- **Give an application more memory under MultiFinder** The Finder's Get Info window lets you fine-tune how large a chunk of memory MultiFinder gives a program. If you increase this amount, more of the application's program code will be able to reside in memory at once. Otherwise, the Mac will have to swap portions of the program into and out of memory as you work. Large, complex programs such as Microsoft Word, Excel, and Aldus PageMaker are especially appreciative of more memory. Use this rule of thumb: if the Mac frequently accesses the disk when you choose commands or click on icons, chances are the program you're running can benefit from extra memory.

- **Activate the RAM cache** The RAM cache stores the most recently

accessed portion of the disk in memory in case its program code or data is needed again. If it is, the Mac retrieves it from the cache instead of accessing the disk. The Control Panel lets you activate the RAM cache and specify its size. Generally, the larger the cache, the better the performance boost, until the cache equals about 25 percent of the Mac's RAM (see "Fast Cache").

- **Use a RAM disk** A RAM disk is a pseudo disk that you create in the Mac's memory using a RAM-disk utility (see "Electronic Disks"). Such a utility is often included with a memory upgrade. You can copy an application to a RAM disk and run it at lightning speed. If the RAM disk is large enough, you can stash the System Folder there too, and improve performance even more. Unless you have more than 2MB of RAM, however, chances are you won't be able to create a RAM disk large enough to hold the System Folder and a couple of applications. Incidentally, you should never store

documents on a RAM disk; if the power goes off (or even fluctuates briefly) or if the Mac crashes, you'll learn the hard way just how pseudo a RAM disk is.

Cache Only

RAM caches and RAM disks sound similar; after all, both improve performance by replacing disk accesses with memory accesses. But beyond that the similarities end. A RAM cache is dynamic; its contents change as you use the Mac. A RAM disk contains only what you put in it. What's more, the effectiveness of each depends on how you use the Mac. If you generally run only one or two programs and you want maximum performance from them, try a RAM disk. If you routinely switch between two or more applications using MultiFinder or if you regularly repeat certain tasks, a RAM cache may be the better choice. But if your computing habits are haphazard rather than repetitive—if you never know which command or program you'll be using next—a RAM cache won't help much, since much of the program code it holds may not be needed again.

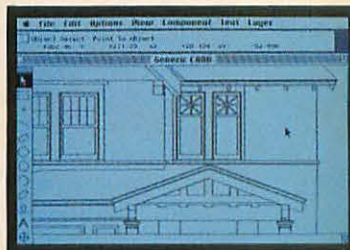
Some Macs can get the performance-boosting benefits of a RAM cache without donating some of the RAM that holds the programs. The IIfx has a slot designed to accept an optional *cache memory* board, which holds a small amount of static RAM that can supply data several times faster than the machine's conventional dynamic RAM chips. Apple's cache memory board will provide 32K of cache memory; other manufacturers have boards in the works that will provide more. Apple claims its cache board will make the IIfx about 20 percent faster.

Those of us who don't drive a IIfx can still benefit from cache memory. Orchid Technology's MacSprint II is a 32K cache memory board for the Mac II that boosts performance by about 30 percent—not bad for a \$299 add-on. You'll also find cache memory on some accelerator boards—those brain transplants that replace the Mac's central processor chip with a faster one (see "Getting Started with Expansion Slots," *Macworld*, April 1989). For example, the Radius Accelerator 16 and (continues)

REAL CADD FOR YOUR MAC... JUST \$149.95!

Affordable CADD. And it's only the beginning.

The CADD stands for Computer Aided Design and Drafting. With a suggested retail price of just \$149.95, Generic CADD Level 1 makes the power of real CADD affordable. And it's just part of a family of Generic CADD products that will make you more productive than ever before.



Standard Mac interface for ease of use.

Now you can produce accurate drawings with real world scale on the Mac Plus, Mac SE, or Mac II. You can edit multiple drawings in separate windows and cut and paste between them. CADD Level 1 is also multifinder compatible.

Symbol Libraries boost productivity.

From office furniture to specialized electronics symbols, our Symbol Libraries save you the time of redrawing repetitive elements every time you need them.

Add the power of real CADD to your Mac.

Move your Macintosh drawings into the real world. **Call us at 1-800-228-3601** for your free CADDalog or the name of your Generic dealer. And find out why we say that the only thing generic about us is the price.

1989 Generic Software, Inc. Generic CADD Level 1 is not copy protected and comes with a 60-day money back guarantee. Registered users get free technical support from Generic.

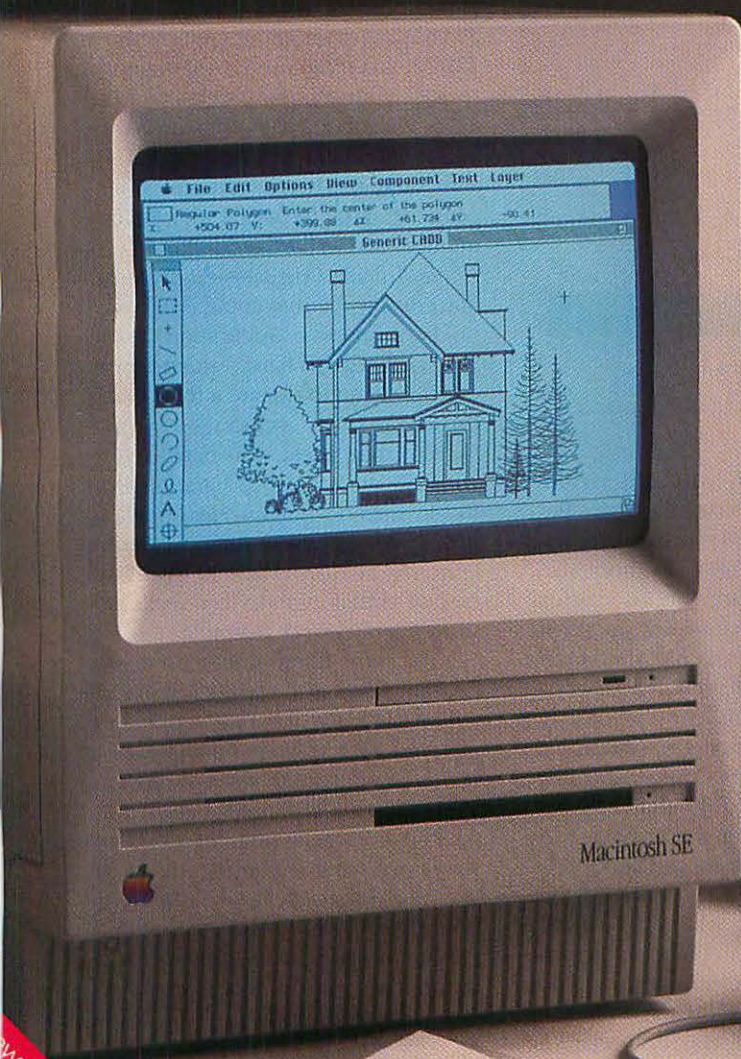
Level 1 and Generic CADD are trademarks of Generic Software, Inc. Macintosh is a trademark of Apple Computer, Inc.

11911 North Creek Parkway South, Bothell, WA 98011

Circle 157 on reader service card

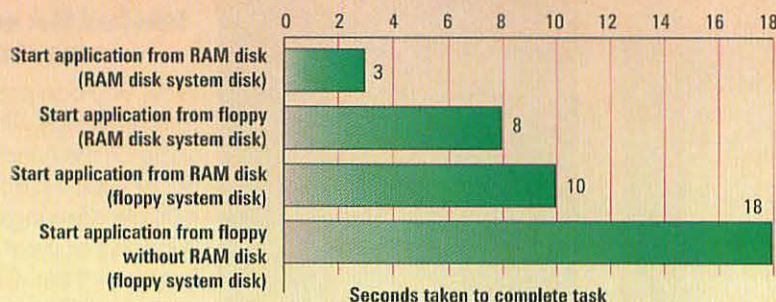
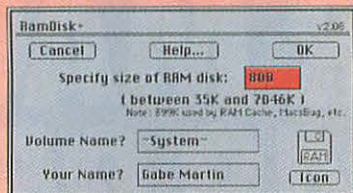
Generic
S O F T W A R E

New version includes snaps, additional drawing tools, DOS/Mac translator, and more!
Call 1-800-228-3601 for details!



ELECTRONIC DISKS

A RAM-disk utility such as Roger Bates's RamDisk+ (top) lets you set aside an area of memory as an electronic disk drive that works at lightning speed. (Another popular shareware RAM-disk utility is George Nelson's RAMStart.) RamDisk+ lists the minimum and maximum practical RAM disk size for the Mac it's running on (in this case, an 8MB Mac II) and also tells you how much memory is being used by the RAM cache and any programmer's debugging aids such as MacsBug. The chart (bottom) compares a RAM disk's effect on performance when it holds just an application (in this case, WriteNow 2.0), just the System Folder, and both the System Folder and an application against performance without a RAM disk.



Accelerator 25 boards for the SE both contain 32K of static cache memory.

Virtual Virtues

One of the most exciting recent developments in Macintosh memory has almost nothing to do with RAM. I'm referring to *virtual memory*, a software sleight of hand that can make a Mac act as though it had far more memory than it actually does.

Virtual memory is essentially a RAM disk in reverse: instead of treating part of RAM as a disk, it treats part of a hard disk as RAM. Set aside 8MB of hard-disk space for virtual memory, and you'll have the electronic equivalent of an 8MB Mac. Virtual-memory system software and the Mac's *memory management* hardware work behind the scenes to swap program code and data between the Mac's RAM and the hard disk. Because hard disk space costs less per megabyte than RAM, virtual memory is an economical way to banish those out-of-memory messages.

System 7.0, a major upgrade to the Mac's system software scheduled to

debut this year, will add virtual-memory features to the SE/30, IIfx, IICx, and IICI. The 68030 processor in these Macs contains built-in memory-management hardware. To use virtual memory on a Macintosh II, you need to add an additional chip, the Motorola 68851 *Paged Memory Management Unit*, or PMMU.

If you can't wait for System 7.0, consider Connectix Corporation's Virtual software, an INIT that adds virtual-memory features to any Mac with memory-management hardware. (The Mac II version of Virtual includes the 68851 PMMU chip, which anyone with steady, static-free hands can install. Specialized versions of Virtual are available for Mac Pluses and SEs that contain 68020 or 68030 accelerator boards.) The latest version, Virtual 2.0, performs some fancy technical tricks that can give you the equivalent of 14MB of memory—even though current versions of the Macintosh's system software support only 8MB. And Virtual runs on 1MB Macs; System 7.0 will require 2MB.

But virtual memory isn't complete nourishment for a memory-starved Mac. For one thing, it's not as fast as real memory—remember, hard disks are mechanical beasts. A Mac with 8MB of real RAM will be faster than the same machine with 2MB of RAM and 6MB of virtual memory. (The exact difference in performance depends on the programs you run and on the speed of your hard disk.)

What's more, virtual memory works best when your Macintosh contains enough RAM to accommodate your largest programs. For example, if one of your programs needs 4MB, your Mac should have 4MB of RAM, even if all your other programs use less than 1MB. If you try to use virtual memory to shoehorn a huge program into a 1MB Macintosh, you'll be forced to endure frequent slowdowns due to *thrashing*, the nearly constant swapping of data between the Mac's memory and its hard disk.

And finally, virtual memory uses hard disk space that could otherwise hold documents or application files. If you have a 20MB hard disk, you may not be willing to donate a third of its capacity to virtual memory.

But then again, you may. If you use only one or two programs—but they're memory-hungry ones—trading disk space for fewer memory problems may be worthwhile. And the low cost of virtual memory can make its slower performance tolerable.

That's the thing about memory—deciding how much you need and how to use it effectively is a game of trade-offs. You must set aside enough memory to accommodate system software and INITs, yet retain enough to run your applications—while your budget stares over your shoulder. The game isn't easy, especially if you're just getting started with the Mac.

But look at it this way: at least you don't have to use wire cutters to change programs. ■

Jim Heid is a Macworld contributing editor who each month focuses on a different aspect of Mac fundamentals. His latest book, coauthored with Peter Norton, is Inside the Apple Macintosh, an advanced user's guide published by Brady Books.

98

Parts Schedule
Materials List
Cost Estimates
Door Schedule



Send list to the
file "Materials?"

Yes

No

Parts Schedule

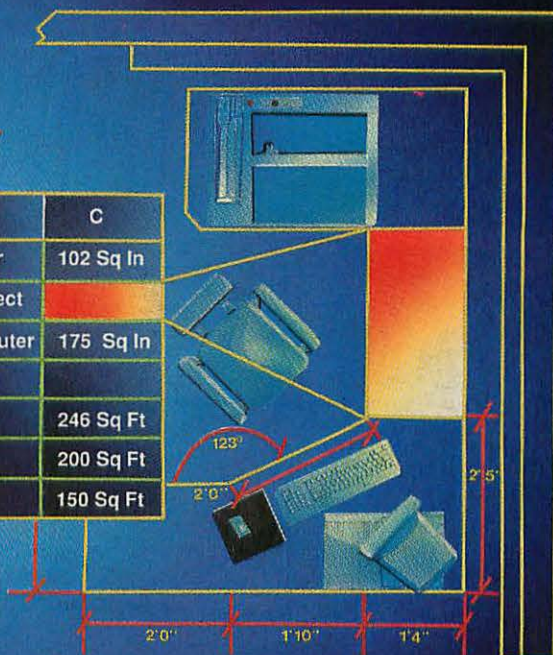
Cost Estimates

Materials List

Qty	Description	
	Surface Materials	23.45
	5/8" Wall Board 5' X 10'	14.50
36	1/8" Tile - Mosaic	56.95
142	Brick - Chicago	12.00
2689	Siding Alum (Sky Bl)	76.95
63	Paneling (Oak)	12.00
12		05.00
	Wall Fixtures- Elec:	67.45
	Wall Outlets	34.00
24	Single-Pole Switches	78.00
8	Modular Phone Jacks	62.00
	CTV Plug-In	\$5.00
	Thermostats	34.00
		67.89
		45.00
	Lighting Fixtures:	12.00
	Faucets	
	Power Enclosure	
	Drayer	

BLUEPRINT
For 2D-Only CAD Users - the Same Award-winning
Quality of MiniCad+ at a Much Lower Price.

	A	B	C
1	Desk Area	Plotter	102 Sq In
2		Mid Sect	
3		Computer	175 Sq In
4			
5	Room	Office	246 Sq Ft
6		Foyer	200 Sq Ft
		WC	150 Sq Ft



MiniCad+™

Computer-Aided Design and Analysis comes of Age

MiniCad+ rises on the foundations of a groundbreaking Macintosh CAD program, MiniCad 2D/3D. Universal in aim, MiniCad Plus is a total design and analysis solution, the answer to time-consuming transfers between applications. This professional CAD system offers the following easy-to-use components:

- High precision 2D drafting environment which includes complex duplication with arrays, hierarchical symbol editing with both external and internal libraries, fillets, bezier & cubic splines, auto-join, auto-dimensioning, continuously variable zoom up to 1000x, double-line tools with auto-clean up, 256 user-definable attributes, 8 line types, unlimited layers, full use of Mac II, and more...
- Active spreadsheet inside drafting area which can be hot linked with objects to perform area calculations, parts schedules, cost estimation and more. As easy-to-use as the spreadsheet you're using now.
- All new integrated 3D that is so powerful and user-friendly we may change your mind about micro 3D.
- MiniPascal, a programmable macro language, will allow advanced users and 3rd party vendors to create reports, macros, and powerful extensions to MiniCad Plus's capabilities.

Graphsoft • 8370 Court Ave, Suite 101 • Ellicott City, MD • 21043

MiniCad+ \$695 • Demo Available for only \$19.00

MiniCad Plotter Drivers: Prof. \$300 Stand. \$150

U.S.: 1 (301) 461-9488 • Canada: 1 (604) 384-2131 • Australia: 61-7-369-1204

Visa & MasterCard Welcome

Graphsoft

Circle 177 on reader service card

BACKUP

Breakthrough...

155 MB SCSI Tape Backup System for the Price of 60 MB!

The MicroPak 155 MB Tape Backup System is remarkable. It can stream at 5 MB per minute. It is small enough to be shared. It retails for less than \$1,000.

Think about it. How much is your data worth? Can you afford to recreate files? An MBT-155 Tape Backup System is an effective way to prevent data loss.

Our tape utility software is easy to use and allows for file-by-file backup and recovery, as well as, mirror image and incremental backup and restore.

The power requirements of the MPT-155 are low. It is designed so that it can safely use the battery of the Macintosh Portable.

MicroNet offers a wide range of Macintosh streaming tape backup systems and hard disk drives that are designed to fit the needs of the entry level user to that of a network manager.

Data sheets and the name of nearest dealer on request.

"QUALITY YOU CAN COUNT ON"

Macintosh is a registered trademark of Apple Computer, Inc.

We offer the finest in Internal and External Hard Disk Drive Systems from 20 MB to 2,022 MB, Tape Backup to 525 MB, 45 MB Removable Cartridge, DAT and Rewritable Optical Systems.



MicroNet Technology, Inc.

20 MASON • IRVINE, CA 92718 • TELEPHONE: (714) 837-6033
FAX: (714) 837-1164 • APPLELINK: D1656 • COMPUSERVE: 76004,1611 • CONNECT: MICRONET

Circle 275 on reader service card

Insights on PageMaker 4.0

TIPS ON USING THE LATEST VERSION OF DESKTOP PUBLISHING'S FAVORED CHILD

T

BY OLAV MARTIN KVERN
AND STEVE ROTH

he newly released PageMaker 4.0 goes a long way toward answering the criticisms leveled against the program by professional users, adding strong typographics and dozens of other features, while retaining the fluid interface that has

always been the program's hallmark. Here's a load of tips for using the new features, and some new workarounds to compensate for the features that still aren't there.

Story Editor

Text editing has always been a problem in PageMaker—originally because of bugs, but lately more because PageMaker is a page-makeup program, not a word processor. PageMaker 4.0 addresses the problem with the Story Editor, which provides a new text view that's set up for more heavy-duty editing (see "Story Editor"). You can get to it a couple of ways:

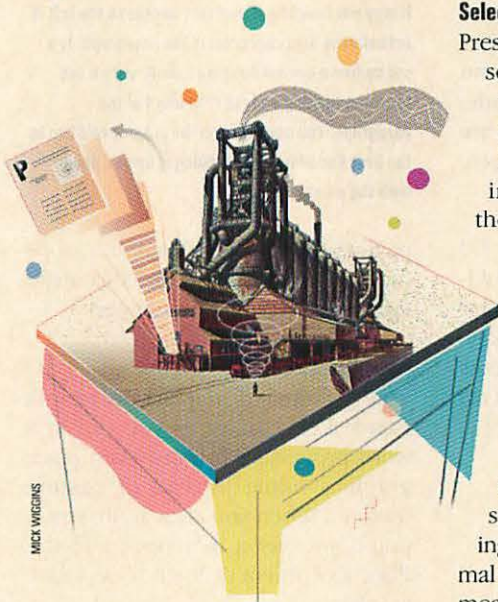
- Triple-click on a text block
- Select a text block with the pointer tool or click an insertion point with the text tool, and press ⌘-E

Some things (search-and-replace, checking spelling) you can do only in story view, some (changing column width and position) only in layout view, and some (general text editing and formatting) in both.

Turning Pages

The quickest way to get to the next page isn't clicking on the icon for the next page. Instead, press ⌘-Tab. To

Adapted from *Real World PageMaker: Industrial-Strength Techniques for the Macintosh*, by Steve Roth and Olav Martin Kvern (Bantam/ITC, 1990).



go to the previous page, press ⌘-Shift-Tab. If you press these keys several times in a row, you jump several pages without stopping to display each one. So even if you're moving forward ten pages, you may find it easier to hit ⌘-Tab ten times (or five times with facing-page view).

To scroll through all the pages, hold down Shift and choose Go to Page, from the Page menu. PageMaker jumps to the first page of the document and starts displaying pages (or spreads) one after another. When it gets to the end it goes back to the first page and starts over. Click to stop at any time. You might first want to

change the page view to something like Fit in Window for all your pages (hold down Option and choose a page view). These tricks also work in PageMaker 3.xx, though hardly anyone seems to know about them.

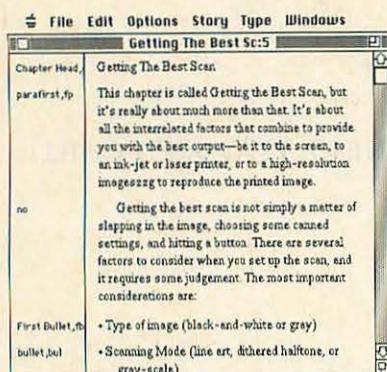
Selecting Tools with the Keyboard

Pressing ⌘-space bar in PageMaker 4.0 selects the pointer tool, no matter what tool you're currently using. If your keyboard has function keys, you can select tools by pressing certain Shift combinations; these also work in 3.xx (see "Toolbox Shortcuts"). If you have QuickKeys or another keyboard utility, you can even eschew the Shift key and just use the function keys.

Percentage Scaling

Although PageMaker still won't size graphics to a percentage you specify, there is a way to do it using a calculator. Choose Inches decimal (or Millimeters) for the horizontal measurement in Preferences (under Edit). Set the zero point to the upper-left corner of the graphic. Measure the width of the graphic. Multiply the width of the graphic by the percentage reduction (or enlargement) you want (for example, if the graphic is 6 inches wide and you've specified an 80 percent reduction, you multiply 6 times .8). Drag out a ruler guide from the vertical ruler until the guide reaches the horizontal ruler at the measurement you found in the preceding step (in this example, 4.8 inches).

Make sure that Snap to Guides is on (⌘-U toggles it on and off); then (continues)



Story Editor

Triple-click on a text block, and PageMaker brings up the whole story in its new story view. When you finish editing and close the window, the changes are reflected in layout view.

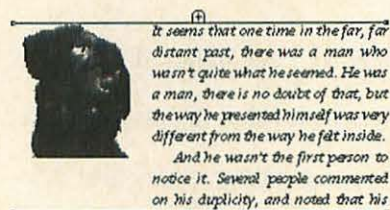
hold down Shift, select the handle on the lower-right corner of the graphic, and resize the graphic until it snaps to the vertical ruler. This technique is fairly accurate, especially if you zoom into 400% size under the Page menu (⌘-4) before setting the ruler guide. In that view, the ruler increments are every .05 millimeters, or every .01 inch.

New Lines

A great new feature in PageMaker 4.0 is the new-line character; while holding down the Shift key press Enter (usually found on the numeric keypad). You use the new-line character when you want to break a line but do

not want to start a new paragraph. For example, when working with complex tables, you might want to add a second line to a table item without adding a new paragraph with its attendant attributes—first-line indent, space before, space after, or paragraph rule. The new-line character is also handy if you want to break a line of justified type and keep it justified.

The tabs on the new line are the same as those on the previous line because they're all part of the same



Hang Dog

It may not look like it, but that doggie to the left is actually the first character in the paragraph. It's set up like a normal hanging indent, with a tab between the dog and the first word of the paragraph. You can position the graphic relative to the first line of text by dragging it up and down with the pointer tool.

paragraph. To set different tab stops on the two lines, you need to make each line a separate paragraph.

Inline Graphics

You can embed graphics in text in PageMaker 4.0, just as you can in a word processor. You can even place graphics inline instead of pasting them in. When you click an insertion point, you get a new option in the Place Document dialog box: As inline graphic.

Inline graphics follow the text flow across columns and over page breaks. No more painful repositioning of graphics relative to text. You can size inline graphics, but you can't set a text wrap for them.

Autoleading

Ordinarily, when you place an inline graphic, it conforms to the leading set for the paragraph. If you want to make the paragraph the height of the graphic, the obvious solution is to choose Autoleading for the paragraph. The only problem is that you'll get some space above and below the graphic. The solution: open the Para-

graph Specifications dialog box (⌘-M) and click the Spacing button.

In the Spacing Attributes dialog box, type 100 in the Autoleading text-edit field. Close the dialog boxes by pressing Return twice. The paragraph is now exactly the height of the graphic. You can create a style for graphics-only paragraphs with auto leading set to 100 percent.

Hanging Inline Graphics

You can even make inline graphics hang outward in a companion column to the left of the main text block (see "Hang Dog"). This trick is similar to creating a normal hanging indent for bulleted lists and the like, but you must use a large indent to leave room for the graphic. For instance:

Left indent: 1 inch
First-line indent: -1 inch
First tab stop: 1 inch

Now place or paste the graphic as an inline graphic, that is the first character in the paragraph. Press the Tab key to move the text over. Select the whole paragraph (including the graphic) and set the leading you want—don't use autoleading or this won't work.

Now comes the magic. Grab the inline graphic with the pointer tool and drag it up and down until you've got it where you want it. You're actually moving the graphic's baseline, positioning it in relation to the baseline of the first line of text.

Tabs Come Up to Snuff

Users of PageMaker 1.2 and 2.0 will remember how badly those versions handled tabs. Version 3.0 went a long way toward improving that, and version 4.0 has almost got it right. The new PageMaker includes a stand-alone table editor program, and much-improved tab handling.

When you choose Indents/tabs from the Type menu (⌘-I), the zero point of the ruler in the resulting dialog box aligns with the left edge of the currently selected text block, if the left edge is visible in the window (see "Adjustable Tabs"). This makes setting tabs a lot easier.

You can now select a tab (in the *continues*)

TOOLBOX SHORTCUTS

These shortcuts are especially useful when you're using a small-screen Mac and want to get the toolbox out of your way.

Shift +

- F1 Pointer tool
- F2 Line tool
- F3 Constrained-line tool
- F4 Text tool
- F5 Rectangle tool
- F6 Rounded-rectangle tool
- F7 Ellipse tool
- F8 Cropping tool



Some.

All.

Why settle for an incomplete set of utilities when you can have them all?

Introducing MacTools® Deluxe—the most comprehensive, powerful collection ever assembled for the Macintosh.

It lets you find misplaced files, recover crashed disks, undelete trashed files, backup your data, optimize volumes, secure files and folders, quickly copy floppies, organize folders, and even partition your hard disk.

Not only do you get the broadest range of utilities available, but each function sets new standards for performance. For instance, let's say you want to undelete a trashed file. Using a selective search, MacTools locates likely candidates and lets you view their contents prior to recovery—so you don't waste time or retrieve unwanted files. No other utility even comes close.

So why settle for some, when you can have it all?

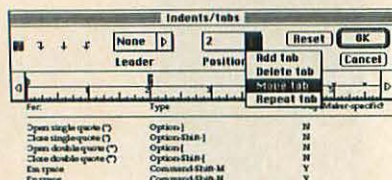
MacTools Deluxe...from the leading developer of Macintosh utilities since 1984.

MacTools Deluxe SUM II 2.0 FastBack II 2.0		
x	x	Data Recovery
x		File Undelete with View
x		Minor File Repair
x	x	Disk Protection
x	x	Hard Disk Crash Recovery
x	x	Hard Disk Backup
x	x	Multiple File/Folder Selection
x	x	Data Compression
x	x	Multiple Setup Files
x		File Locator DA
x	x	Hard Disk Partitioning
x		Automount w/Password Prompt
x	x	Hard Disk Optimization
x		Complete Disk Erase
x		Color Disk Map
x	x	Secure/Encrypt File
x		Desk Accessory
x	x	Fast Floppy Copying
x		File Management

Central Point Software INC
(503) 690-8090

Minimum requirement: Macintosh Plus. MacTools is a registered trademark of Central Point Software. All other product names are trademarks of their manufacturers.

Circle 357 on reader service card



Adjustable Tabs

In PageMaker 4.0, the tab ruler lines itself up with the left edge of a selected text block, and you can modify existing tabs, rather than having to delete the old and add a new one.

Indents/tabs dialog box) that has already been set and change it to any other type of tab by clicking on the tab icon you want, or you can type in the tab's new position. You can also change a tab's dot leader by selecting the tab and making changes in the leader-text edit box.

One last tabular note for financial page-makers: version 4.0 now properly aligns columns of decimal-tabbed figures even when some figures are in parentheses and there are no decimal points. Footnotes must be next.

Define Colors Fast

Bypass the Define Colors dialog box

by ⌘-clicking on Registration in the Color palette. You get the New Color dialog box. If you've got an object selected when you ⌘-click on Registration, the New Color dialog box fills in with the color attributes of the selected object. Define a new color, press Return, and the color name appears in the Color palette.

Because PageMaker doesn't apply the new color to the selected object until you click on the color name in the Color palette, you can use this technique repetitively to create a series of tints of some base color or to create a series of entirely new colors.

Replace One Color with Another

Have you ever defined more colors than you want? Here's the fast way to replace one color with another (to end up with fewer spot-color overlays, for example).


Choose Define Colors from the Options menu and double-click on the name of the color you want to change. Make its name the same as the color you plan to replace it with, and click OK.

When PageMaker displays the prompt "Replace all of <firstcolor> with <secondcolor>?" click on Yes to replace the color. At this point, a peculiar thing (which may or may not be a bug) happens—the OK button goes gray and you can't leave the dialog box and keep your changes. Just select any color, and you can then click OK or press Return. Every item that was the first color becomes the second color. (You can use a similar technique for replacing styles.)

Fun with Type Options


There's a new dialog box in PageMaker 4.0 that lets you set superscript and subscript sizes and positions, and the size of small caps. At first glance, it may not seem to offer much. However, if you dig a little deeper, you discover that it lets you create some nifty type effects. Here, for instance, is yet another way to create drop caps in PageMaker (see "Dropping Out"). You need to specify fixed leading—not autoleading—for this to work.

Select the first character in the
(continues)



PostScript®
on almost any printer
No Hardware Required

\$145



TScript PostScript software interpreter outputs from any Macintosh or IBMPostScript application. TScript supports HP LaserJet series, DeskJet, DeskWriter, GCC PLP, LaserWriter SC, ImageWriter, Canon LBP. Previews PostScript files to Mac screen. Runs on MacPlus or higher. Also available, color PostScript on Mitsubishi printer and Mirus FilmPrinter.

30 DAY MONEY BACK GUARANTEE

Dealer
Inquiries
Welcome

TScript® is a registered trademark of TeleTypesetting Co., PostScript is a registered trademark of Adobe Systems, Inc. All other products and names are registered trademarks of their respective manufacturers. TScript was formerly called MacRIP.

TeleTypesetting
617-734-9700

See us at SF
MacWorld #5229

Circle 476 on reader service card.

QUESTION: Why would your computer warranty only be good for 90 days?
ANSWER: Simple. Because computers break down!



Sooner or later, your computer will break down. Or, at any time you could be the victim of a power surge, fire, theft, natural disaster, accidental damage, and more. The odds against you are high.

Unless you have the ready cash to repair or replace your computer system, you need

SAFWARE FIX:IT. Be insured for mechanical breakdown, (wear and tear) as well as external losses. All in a single policy for as little as \$100. per year. Call free for full information!

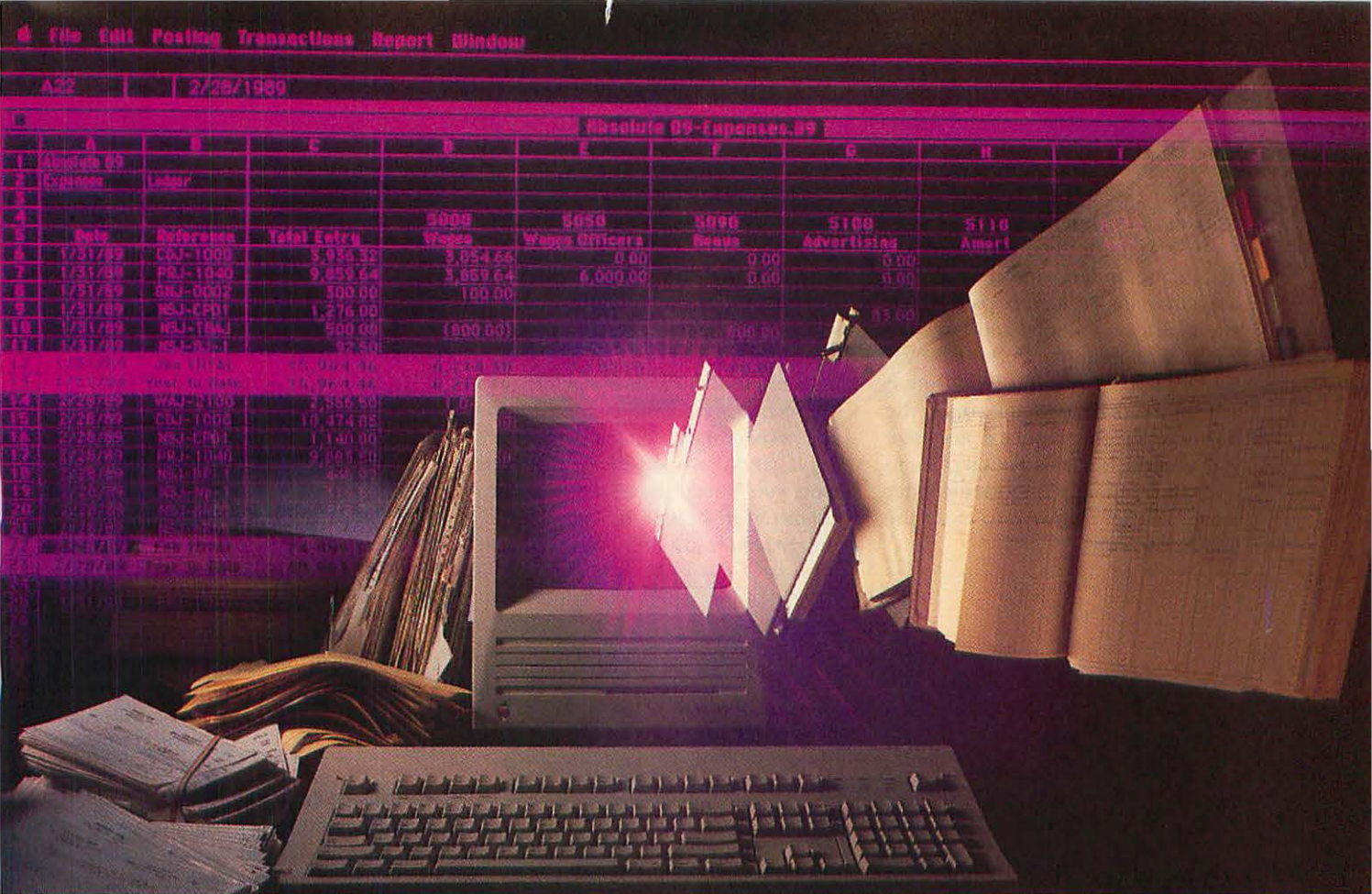
1-800-822-2345

Local 614-262-0708 Fax 614-262-1714



SAFWARE, The Insurance Agency Inc.
2929 N. High Street • P.O. Box 02211
Columbus, OH 43202
Not Available in All States

Circle 293 on reader service card.



Now that you bought Excel...

Now, for the first time, a complete accounting Microsoft Excel spreadsheet General Ledger AR/AP/ Inventory program that looks like manual books, works like manual books yet offers all the advantages of computerization. *Computerized Classic Accounting™* allows you to do accounting the way you've learned it, translated to the speed and power of Microsoft Excel, the ultimate spreadsheet. No long start-up periods, no extensive employee training, no difficulty in audit... just the most logical, fastest, most flexible way to keep books you've ever seen.



(Jan. 1990 MacUser Magazine)

"Mimicking the paper journals and ledgers that bookkeepers and accountants are accustomed to...*Computerized Classic Accounting™* provides a remarkable level of accounting, record keeping and analysis, in a simple flexible product that can be easily customized."

-Ken Landis, Jan. 1990 MacUser Magazine

"*Classic Accounting™* is the only computer accounting product that returns us to real accounting."

-Dr. Samuelson, Chairman of Accounting and Law, Pepperdine University

Circle 474 on reader service card

...*Computerized
Classic Accounting™*

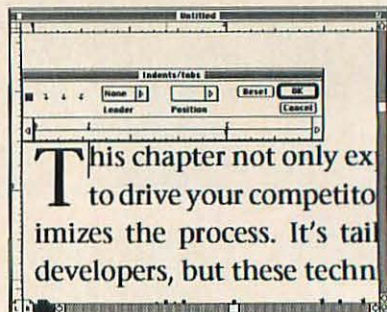
**TO ORDER NOW OR FOR
MORE INFORMATION CALL**

in CA 1-800-458-3399, Nat'l., 1-800-633-7666,
Int'l., 1-619-966-8000, in Canada 1-800-245-0223

paragraph, and call up the Type Specifications dialog box (⌘-T). Choose the size you want for the drop cap (don't change the leading) and choose Subscript from the Position pop-up menu. Then click on Options and type 100 for Super/subscript size and 50 for Subscript position in the Type Option dialog box. You have to adjust the position for the typeface and size you're using, but 50 is a good place to start. Higher numbers move the letter down. Hit Return twice to close the two dialog boxes.

Next, place the insertion point immediately to the right of the dropped capital and press Tab. Bring up the Indents/tabs dialog box (⌘-I) and align the first tab with the point at which you want the body copy to start. Go to the end of the line and press Return; put a tab at the beginning of the second line. Continue for as many lines as necessary.

If you're working with justified type, you'll need to use the new-line character at the end of each line so they stay fully justified or use normal



Dropping Out

You can create drop caps by treating the cap as an oversize subscript, and adjusting the subscript position. Then you set tabs (in this example, before his and to) for the position of the body text.

Returns and justify the lines using the new Force justify alignment option. For another example of fancy effects from Type options, see "Type within Type."

Searching and Replacing

PageMaker 4.0's Story Editor has great search-and-replace features, including the ability to replace text attributes. You can search for every instance of character formatting and replace it with different formatting. This is especially handy if, for example, all the product names in your company brochure should be in 9-point Stone Sans Bold Italic. You can use some attribute that's easy to apply from the keyboard (like outline or underline), then replace that formatting with 9-point Stone Sans Bold Italic.

Open the story you want to change with the Story Editor, then choose Change from the Edit menu. Do not enter any text in the Find What and Change To text-edit boxes. Click on the Attributes button, and enter the current formatting attributes of the text, then enter the new formatting attributes.

(continues)

Copacabana

Type within Type

Here's another interesting type effect using the Type Options controls, with the addition of kerning (lots of kerning). You've probably seen this type effect often—particularly in corporate logos and advertising.

Because in every major market of the world, the Computer Connectivity Series of the ICCs gives the PC networking professionals what they need



to know about LANs, networking, modems, software, personal computers and associated products.

Through product demonstrations and technical seminars, the attendees, in one day, learn the latest technology and discuss their application requirements.

Manufacturers have the opportunity to meet one-on-one with industry leaders, Corporate MIS/DP managers and third party distribution personnel, to demonstrate their products and reinforce their commitment to customer support on a regional basis.

JOIN THE 1989/90 COMPUTER CONNECTIVITY SERIES

U.S. LOCATIONS

Los Angeles, CA	October 26, 1989
Ft. Lauderdale, FL	November 30, 1989
New York City, NY	April 12, 1990
Dallas, TX	April 24, 1990
Boston, MA	May 8, 1990
Palo Alto, CA	May 24, 1990
Seattle, WA	May 31, 1990

EUROPE LOCATIONS

Madrid, Spain	September 19, 1989
Paris, France	October 2, 1989
Brussels, Belgium	October 4, 1989
London, England	February 8, 1990

ASK ABOUT THE ASIA/PACIFIC SERIES!

For more information contact: Invitational Computer Conferences, a division of Dataquest, 3151 Airway Ave., C-2, Costa Mesa, CA 92626, Telephone: (714) 957-0171, Telex: 5101002189 ICCDQ, FAX: (714) 957-0903.



"Everyone concerned about Computer Connectivity should go to the Invitational Computer Conferences."

EDWARD COOPER
SENIOR DIRECTOR OF MARKETING
NETWORK PRODUCTS GROUP
NOVELL, INC.

When you need a change of face.

You bought ATM™ to clean up your text; now add TypeAlign to throw your text a curve—or give it a new slant. And do it so intuitively, you'll wonder why everyone doesn't do it our way.

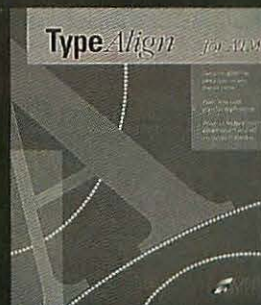
TypeAlign is incredibly easy to use—no special drawing programs or skills needed. Just choose a tool to draw an arc, straight line or freehand curve. Type on the line you just drew—your words appear instantly on screen. Adjust the spacing between letters and words until it's just the way you like it. Then rotate, manipulate, distort to your heart's content.

Since TypeAlign is a desk accessory, you install it once in your Macintosh® computer, then use it in just about any application. And you can print your creation on any ATM-supported printer or other device, including Apple® ImageWriters®, LaserWriters® and Hewlett-Packard® DeskWriters® and PaintJets®. Of course, TypeAlign works with any Adobe® PostScript® font, too.

Let's face it. If you have ATM, you need new TypeAlign, too. Especially with a suggested retail price of only \$99.95.

To find out where you can buy it, call Emerald City Software at 1-800-223-0417, in CA 415-324-8080.

TypeAlign™—a new desk accessory exclusively for Adobe Type Manager™ owners.

TypeAlign is a trademark and Emerald City Software is a registered trademark of Emerald City Software. Adobe and PostScript are registered trademarks and Adobe Type Manager and ATM are trademarks of Adobe Systems Incorporated. Apple, ImageWriter, Macintosh and LaserWriter are registered trademarks of Apple Computer, Inc. HP, DeskWriter and PaintJet are registered trademarks of Hewlett-Packard, Inc. © 1989 Emerald City Software. All rights reserved.

**EMERALD
CITY
SOFTWARE**

Dealers circle 512 on reader service card
End users circle 513 on reader service card

HARD DRIVE WARS

CALL AMERICA'S Macintosh Hard Drive SPECIALISTS

We Carry All Major Brands AT THE NATION'S LOWEST PRICES

EXTERNAL HARD DRIVES

100 MB *OUR BEST* \$888

40 MB *ONLY* \$488

INTERNAL HARD DRIVES FOR YOUR MAC

50 MB \$448

65 MB \$488

100 MB \$848

2 YR EXTENDED WARRANTY AVAILABLE

NEED LARGE CAPACITY? 46MB Removeable Drive Cartridges: The New Standard! Now your storage capacity grows as you do.

240 MB REMOVEABLE \$1388

800 331-1322 Compare...Then Call Us Last!

Mac Friends WE SPECIALIZE IN MAC ONLY! SEE OUR ADS ON PAGES 28, 52, 193

Leases, COD's Credit Cards OK!

All brand names shown are trademarks of their respective owners

Circle 86 on reader service card.

Press Return to go back to the Change dialog box, then click on the Change all button. All text that was formatted with the first set of attributes will be reformatted with the second set of attributes. Depending on the formatting you specify, you may not be able to see your changes until you return to the layout view.

The Change Attributes dialog box still has some limitations: you can't search for (or change) based on attributes for leading, color, case, position, tracking, or Set width (type condensation or expansion). Still, it's a big improvement over the previous versions.

Rotated Text Blocks

PageMaker 4.0 lets you rotate anything you want as long as it's text, as long as it isn't threaded to other text, and as long as you're satisfied with 90-degree increments. If you've been trying to rotate a text block and the Text Rotation selection on the Element menu remains grayed out, you need to make sure that

- all the text in the story has been placed,
- the text block is not threaded to any other text block,
- no more than one text block is selected,
- the text block does not contain any inline graphics, and
- the story is not open in the Story Editor.

Quick Index

The indexing in PageMaker 4.0 is about as well conceived as anything we've seen (or envisioned). There's a lot to it, but if you want to add just one word, double-click with the text tool to select the word, press ⌘-Shift-; and press Return.

Double Your Pages, Double Your Funds

You can save 50 percent on service-bureau charges by printing two PageMaker pages side-by-side on a single piece of paper or film. You have to have room for two pages across the roll.

The trick is to use Manual Tiling. Set the page size you want in Page Setup. Choose double-sided, facing pages. Set the ruler's zero point to the upper-left corner of the left-hand

page. This sets the upper-left corner of your tile.

In Print Options, select Letter, Wide (if you need a different size, you'll need to edit the APD file for your imagesetter). In the Print dialog box, select the left-hand page to print (page 2, or 4, or whatever) and press Return. The right-hand page just comes tagging along with it, within the size limits of the imagesetter.

You have to choose each left-hand page to print individually, and service bureaus won't want to babysit your job that much, so you might want to save each spread in PostScript format (Choose Options in the Print dialog box) then send all the PostScript files to the service bureau. PageMaker will not print automatic crop marks for the right-hand pages using this method, so you will probably want to place your own crop marks on the master pages.

Printing Outside the Page Area

You can print whatever you want outside the page area (within the limits of the actual physical paper size). If you want registration marks someplace other than where PageMaker puts them, or if you want to print a job name, date, or time, here's how.

Create a white box in a draw program, put the registration mark inside the box, then copy and paste both the box and the registration mark onto the page (with FreeHand or Illustrator, you'll have to Option-copy). As long as some part of the graphic (in this case, the white box) is touching the page, PageMaker will print the whole thing—within the limits of the output device's imaging area.

Sharing the Wealth

If you've found a tip or shortcut not mentioned here, spread the word to other Macworld readers by sending it to *Quick Tips*, Macworld, 501 Second St., San Francisco, CA 94107. ■

Olav Martin Kvern and Steve Roth (a Macworld contributing editor) spent the last nine months writing the definitive Macintosh PageMaker book. Between them, they've produced a stack of PageMaker pages several stories tall.

Can Your Data Modem Do This?



Ours Can...

Data+Fax... At Data Modem Prices

The ProModem® Data/Fax Series from Prometheus® adds Group III fax capabilities to a 2400 BPS data modem for a low cost solution to your data and fax needs. Thanks to Sendfax™ technology, you can now get Group III originate-only fax capability for the price you'd expect to pay for a data modem alone. The Data/Fax modems allow you to send faxes or data anywhere in the world.

The ProModem Data/Fax modems provide you the convenience and flexibility of your own personal data and fax modem whether you're at the office, home or on the road. Every computer can now afford to be a personal information center. These modems allow you to easily send documents by E-Mail or fax and also retrieve business information through on-line services, all for a suggested retail price of \$299.

Includes MACKNOWLEDGE

MACKNOWLEDGE™ is the first communications software package that makes using modems easy! MACKNOWLEDGE automatically configures your modem, allows you to send, receive and reply to electronic mail and access current business and financial information at

the click of an icon. You'll be using your modem in minutes with MACKNOWLEDGE.

Effortless Faxes With BackFAX

Sending a fax with a Data/Fax modem is as easy as printing. Simply select the fax icon from the Chooser and print as you normally would from any Mac application. BackFAX™ will send it in the background, while you go back to work, with or without MultiFinder™! BackFAX supports automatic scheduled calling, customized cover sheets, and distribution lists.

The ProModem Data/Fax external works with any Macintosh®, or if you have a Mac Portable try our new internal TravelModem™. The ProModem Data/Fax Series is another reason why Prometheus is the leader in communication products.



PROMETHEUS®
PRODUCTS • INC.

Communication products from a communications company

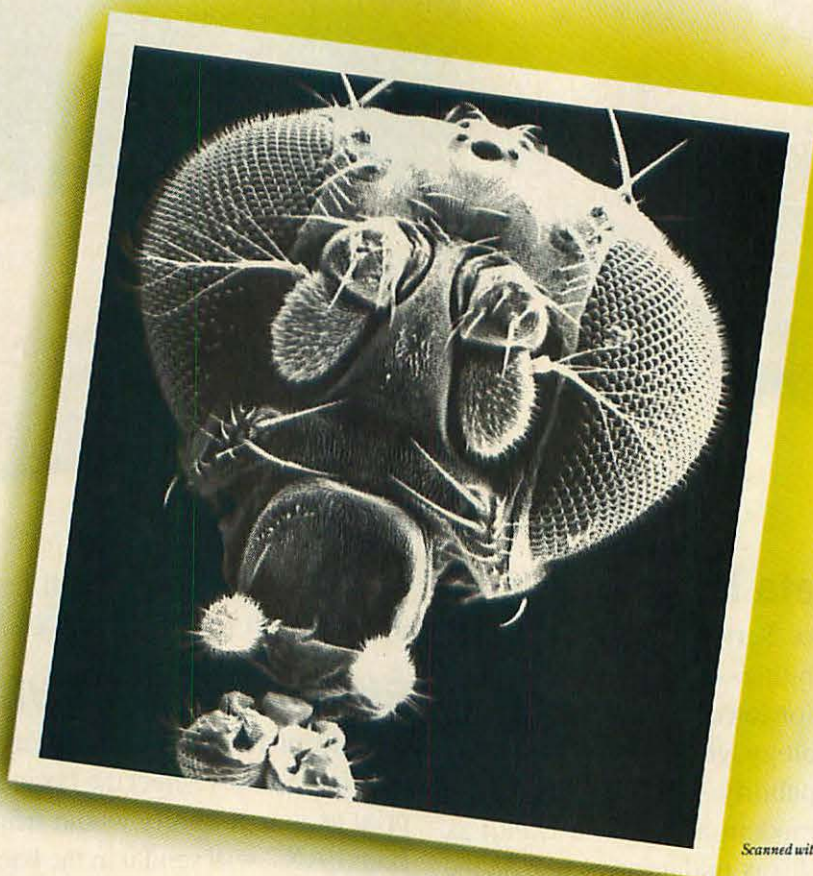
7225 SW Bonita Road • Tigard, OR 97223
(800) 477-3473 • (503) 624-0571 • (503) 624-0843 (Fax)

Proudly Distributed By Ingram Micro D and MacAmerica

Sendfax is a trademark of Sierra Semiconductor Corp.
All other trademarks are acknowledged

Circle 184 on reader service card

8-bit upgrades invade Apple scanner.



Scanned with the Abaton 8-bit Upgrade

Get all the gory details.

In as few as thirty minutes, an 8-bit Abaton Upgrade can invade your Apple scanner. Leaving you with more detail in your scanned images than before. Because Abaton's 8-bit Upgrade lets your 4-bit Apple scanner read 240 more shades of gray than the current 16. So your black and white images have all the rich details found in your original photos.

And this invasion won't be a nightmare. Just place your order, and within 48 hours, a technician will call to schedule an upgrade encounter at your home or office. There's no risk, since your upgraded scanner is covered for 90 days.

Or you can extend the warranty to suit your needs.

But best of all, the Abaton 8-bit Upgrade makes it easier for you to publish. You can see every page before it's sent to a phototypesetter. And that's a publishing plus.

If you want all the gory details on Abaton's 8-bit Upgrade invasion, call Abaton at 1-800-444-5321, and let Abaton make your ideas easier to publish.

Abaton

We Make Your Ideas Easier to Publish™



Dealers circle 289 on reader service card
End users circle 294 on reader service card

Abaton and "We Make Your Ideas Easier to Publish" are trademarks of Everex Systems, Inc. Other brand names and product names are trademarks and registered trademarks of their respective companies.

UPDATES

Here's our list of the current shipping versions of Mac software. Because these days, keeping track of the latest CPU is tough enough.

Canvas version 2.1 has enhanced bezier curves, editable dashed lines, a 100,000-word spelling checker, and an improved alignment manager. The new version imports MacDraw II native format files, exports EPS files, and features a four-color process-separation utility. Deneba Software, 7855

N.W. 12th St., #202, Miami, FL 33126; 305/594-6965. Contact dealer for upgrade policy; \$299.95 new.

Freedom of Press version 2.2 is able to accept Adobe Systems' encrypted Type 1 fonts. CAI, 900 Technology Park Dr., Bldg. 8, Billerica, MA 01821; 508/667-8585. Upgrade \$45 for registered owners; \$495 new.

MacTerminal version 2.31 extends MacTerminal's capabilities to include sup-

port for the Mac IICI and Mac Portable. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010. Upgrade free for registered owners; \$125 new.

Virex version 2.3 now enables users to set a password so that only authorized personnel can change settings. This version also combats WDEF virus. HJC Software, P.O. Box 51816, Durham, NC 27717; 919/490-1277. Contact dealer for upgrade policy; \$99.95 new.

PRODUCT COMPARISON

Product	V.	Req.	Rev.	Price
1st Aid Kit ★	2.8	512K/3.0		*
4th Dimension	2.0	1MB/5.02	3/90	*
Aatrix	2.01	512K/4.1		\$10
CheckWriter II ★				
Aatrix	2.0	512K/4.2		Free
TimeCard				
Accountant Inc.	2.1	1MB/6.02		\$9.50
AccuText ★	1.1	4MB/6.02		*
AdWriter	2.0	1MB/6.0		Free
Alchemy	1.1	1MB/6.0	1/89	\$25
Aldus	2.0	1MB/6.03	6/89	*
FreeHand				
Aldus	2.02	1MB/4.1		*
PageMaker				
Aldus	2.0	1MB/6.0	6/89	*
Persuasion				
AmPack Plus ★	4.2.2	512K/3.2	1/90	\$29.95
Analog Connection	3.0	1MB/5.0		\$50
WorkBench				
Anatool ★	3.1	512K/3.0	7/89	\$35
AntiToxin	1.2	512K/4.2	2/90	Free
APL 68000	7.0	512K/3.2		*
AppleShare	2.0	512K/3.2		*
File Server				
Archie	2.0	1MB/6.0		\$75
ArchiText	2.0	1MB/6.02	7/89	Free
Aristotle's	2.0	2MB/6.03		Free
Politics				
The Art	2.0	1MB/6.0	8/89	\$20
Importer				
ArtRoom	3.0	512K/3.2		\$199
AutoCalc	2.0	1MB/6.0		\$95
Aztec C	3.6	512K/4.2		*
Back to Basics:	2.0	512K/3.2		\$75
Professional				
Ball & Stick ★	2.2	1MB/6.0		Free
Bill-It	2.0	1MB/6.03		\$29
Bridge	6.0	512K/3.2		\$17

Product	V.	Req.	Rev.	Price
Business	1.5	1MB/6.02		*
FileVision ★				
Business	1.2	1MB/5.0		*
Sense ★				
Business	3.2	512K/3.2		Free
Session ★				
CA-Cricket	2.0	1MB/5.0		Free
Presents				
Calculator	2.06	512K/3.2	4/90	\$25
Construction Set ★				
Canvas	2.1	1MB/5.0	4/89	*
Capture	2.0	1MB/5.0	2/90	\$15
ChromaScan	1.1	4MB/5.02		Free
Colorset ★	1.2	1MB/5.0		Free
Comment	2.02	1MB/5.0	2/89	*
Commtext	2.0	1MB/5.0		Free
CompileIt	1.2	1MB/5.02		Free
CompuServe	2.1	512K/3.2		*
Navigator ★				
Control	1.5	1MB/4.1		Free
Cue	3.0	1MB/5.03		*
DataDesk	3.0	512K/4.02		\$125
DataMerge	2.0	512K/3.2		Free
Deluxe Music	2.5	512K/5.02	9/89	*
Construction Set				
D.E.S.	4.0	1MB/5.0		*
Design	2.15	5MB/5.03		Free
Dimensions ★				
DeskPaint ★	2.1C	512K/4.2		Free
DiagramMaker ★	1.1	1MB/5.02		*
Digital Darkroom	1.1	1MB/5.02		Free
DiskFit	1.5	512K/4.1		*
Network DiskFit ★				
DiskTop	4.0	1MB/5.0		*
Display	1.1	1MB/5.03		*
AdBuilder				
Dollars	4.1	512K/3.2		*
and Sense				

Product	V.	Req.	Rev.	Price
DragonWave	1.1	1MB/6.03		*
Empower ★	2.05	1MB/5.0	6/89	Free
EndLink	1.1	512K/3.2		Free
EndNote	1.2	512K/3.2	6/89	Free
Extender	3.0	1MB/6.02		\$30
GrafPak				
Falcon	2.1	1MB/3.2		Free
Fastback II	2.1	512K/4.1	12/89	\$25
Fast Forms ★	1.2	512K/3.2		\$25
Ferrari	1.6	512K/3.2		\$10
Grand Prix ★				
FileMaker II ★	1.1	1MB/4.2		*
Finale ★	1.2	1MB/6.02		Free
Financial	3.0	512K/3.0		*
Analysis				
Findswell	2.0	512K/3.2	3/90	*
Fontographer	3.0	1MB/6.0		*
FontShare	2.0	1MB/6.0		Free
FoxBase+/Mac ★	2.10	1MB/6.0		\$75
Freedom	2.2	1MB/6.0		Free
of Press ★				
FreeFlow	3.0	1MB/6.03		Free
Full Impact ★	1.1	1MB/6.0		Free
FullWrite	1.1	2MB/6.02		Free
Professional ★				
Gofer ★	2.01	1MB/4.1		\$25
Grafpoint	2.0	2MB/6.0		*
Help DA	3.0	1MB/6.0		Free
HFS Backup	3.0	512K/3.2	8/89	\$35
Hybase ★	1.1	1MB/6.0		Free
HydroMac	2.0	1MB/6.0		*
HyperAnimator ★	1.5	1MB/6.03	6/89	\$29.95
HyperCard ★	1.2.2	1MB/6.03		\$10
HyperDA ★	1.2	512K/3.2		\$10
HyperEngine	1.1	1MB/6.03		Free
Developer's Tool ★				
HyperLibrary	2.0	1MB/5.0		*

(continues)

Bold = first time the product is being listed.

★ = minor update.

Req. = min. RAM and system software required.

Rev. = last time (in past year) reviewed this or an earlier version.

Price = cost for update to registered owners.

* = contact your dealer for update policy.

Invest In Futures.



There's probably no greater return on an investment than when you give to the Boys & Girls Club. You'll be helping the Club provide the guidance and inspiration young girls and boys need to achieve success for themselves and progress for America.

Make a contribution today, so they can make one tomorrow.



BOYS & GIRLS CLUB

The Club that beats the streets.

PRODUCT COMPARISON

Product	V.	Req.	Rev.	Price	Product	V.	Req.	Rev.	Price
HyperPort	2.0	1MB/6.0		\$10	MacProject II	2.0	1MB/6.0	8/89	*
Chess					MacProof ★	3.2.1	1MB/6.02	2/90	\$30
HyperWindows ★	1.1	1MB/6.02		Free	MacRecorder	2.0	512K/3.2	12/89	*
Icon-It ★	1.2	1MB/6.0		*	MacSchedule	2.0	1MB/6.0		\$30
Iconia ★	7.0	1MB/6.0		*	MacSmarts	3.0	1MB/6.0		*
Igor ★	1.1	1MB/6.0		Free	MacTell	3.5	512K/3.0		*
ImageStudio	2.0	1MB/6.0		Free	MacTerminal ★	2.31	512K/3.2		Free
ImageWriter LQ	2.0	512K/3.2		Free	MacVision	3.0	1MB/6.0	7/89	\$79.95
Print Driver ★					MacWrite II	1.1	1MB/6.0		Free
In-CAD	2.0	2MB/6.0		*	Managing	2.0	512K/6.03		\$49.95
InfoLogic	6.0	512KE/4.0		\$5	Your Money				
Envelope ★					MapGrafx	2.0	4MB/6.03		Free
Insight Expert	2.2	1MB/6.0		*	MarketMaster	II+	1MB/6.03		\$25
Accounts Payable					Master	4.0	1MB/4.1		\$45
Insight Expert	2.2	1MB/6.02		*	Tracks Pro				
Accounts Receivable					MathType	2.0	512K/6.02	11/89	*
Inspiration	2.0	1MB/4.2		Free	Matlab	1.2	1MB/3.0		*
Instant-Expert	3.0	1MB/5.0		Free	MaxPage ★	1.2	512K/3.2		Free
Plus					McMax	2.0	1MB/5.0	8/89	*
JetLink Express ★	1.01	1MB/6.0		Free	Memorybank	3.0	1MB/6.0		Free
KidsTime ★	1.2	512K/3.2		\$15	Manager				
Kiw-Envelopes	3.0	512KE/4.1		\$10	MGMSation ★	2.5	512KE/3.0	4/89	*
Language Systems	1.2	1MB/6.03		*	Microsoft File	4.0	512K/3.2	4/89	*
Fortran Compiler ★					Microsoft Mail	2.0	1MB/6.02	1/90	*
LapLink Mac	2.0	512K/2.0		Free	Microsoft Word	4.0	512KE/3.2	10/89	*
LaserPaint	1.02	1MB/6.03		Free	Microsoft Works	1.2	512K/6.0	4/89	*
Color II ★					MindWrite ★	2.1	512KE/4.2		*
LetrTuck+	2.0	512K/3.2		\$20	MiniCad +	2.0	1MB/6.0	11/89	*
Lookup	2.0	1MB/6.0		*	MiniDraw	4.0	512KE/4.2		\$17
Mac86	2.0	1MB/6.02		\$10	MacPackage Plus	4.4	512KE/3.2		\$15
Mac286	2.0	1MB/6.02		\$10	Utilities				
Mac3270	2.0	1MB/6.03		*	Modern Artist	2.0	2MB/6.02		\$150
MacArchित्र	4.0	2MB/6.03		Free	Monte Carlo	2.0	1MB/6.03		\$60
MacAtlas	2.0	512K/3.2		\$35	Moro II ★	2.01	1MB/4.1	6/89	Free
Paint					MSFL: Pro League	2.0	1MB/6.0		*
MacClint ★	1.1	1MB/5.0		Free	Football				
MacConcept	3.0	1MB/6.03		*	MultiLedge ★	1.1	512K/3.2		Free
MacDesigner	2.0	1MB/3.2		\$297	Multi-User	3.01	512K/3.2		*
MacDraw II	1.1	1MB/6.0		*	Appointment Diaries				
MacEnvelope	4.1	512K/3.2		*	Music	2.0.3	1MB/6.0		Free
MacFalcon	2.1	1MB/6.03		*	Publisher				
MacFlow	3.0	1MB/6.03		\$30	MyTimeManager	2.0	1MB/6.0		*
MacFortran	2.4	512K/4.2		*	Navigate	2.0	1MB/6.0		Free
MacFortran/020	2.4	512K/4.2		*	Nemesis Go	4.0	512K/4.1	6/89	*
MacFortran	1.1	2MB/6.02		Free	Master				
for MPW					The NightWatch ★	1.03	512KE/3.2		*
MacHerbal	2.0	512K/3.2		\$49	Nisus	2.0	1MB/6.02	9/89	Free
MacHotel	3.3	1MB/6.03		Free	NuPaint ★	1.04	512K/3.2	5/89	Free
MacLine	3.0	512K/3.0		\$25	Nutrition	2.0	1MB/6.02		\$20
MacLinkPlus/	4.0	512KE/3.2		\$45	Stack				
Wang VS					OmniPage	2.0	4MB/6.02	2/90	\$150
MacMainFrame	2.1	2.5MB/6.02		\$100	Omni 3 Plus/	2.0	512KE/3.2		*
3270/CUT					Express				
MacPhonebook	2.0	512KE/3.2	1/90	*	On Schedule	2.0	1MB/3.0		*
MacPrint	1.1	1MB/6.02		Free					

(continues)

DATA STORAGE

- SCSI Hard Disks
- DAT & Removable
- Streaming Tape
- Rewritable Optical
- 20 MB to 2,022 MB
- Fast as 5.4 ms

MicroNet offers a wide range of Macintosh storage products that easily match any configuration.

We specialize in MacWren hard disks that are industry known for their performance and reliability. Our Overlapped Seek Systems offer access times as fast as 5.4 ms.

MicroPak Transportable hard disk drives are cost effective and are popular for transporting data between computers.

Don't choke your Ilcx/Ilci with a 3.5" hard disk! Our unique 5.25" internal systems are 66% faster than a 3.5" Quantum hard disk.

Our Optical Systems allow you to have nearly 600 MB of rewritable storage on one disk. These M/O systems have the best access time and the highest transfer rate of all.

For serious data backup we offer 1.3 GB Digital Audio Tape, Streaming Tape to 525 MB and our 20 ms, 45 MB SyQuest Removable Winchester Cartridge System.

Call for data sheets and the name of your nearest dealer.

"QUALITY YOU CAN COUNT ON"

Macintosh, SyQuest and Quantum are registered trademarks

We offer the finest in Internal and External Hard Disk Drive Systems from 20 MB to 2,022 MB, Tape Backup to 525 MB, 45 MB Removable Cartridge, DAT and Rewritable Optical Systems.



MicroNet Technology, Inc.

20 MASON • IRVINE, CA 92718 • TELEPHONE: (714) 837-6033
FAX: (714) 837-1164 • APPLELINK: D1656 • COMPUSERVE: 76004,1611 • CONNECT: MICRONET
Circle 398 on reader service card

One Of America's Best Run Companies Gives 95% Of Its Money To Charity.

CARE was recently named the best run, best managed charity in America.

We aren't surprised. 95% of every dollar we receive goes to help impoverished people. Only 5% goes to run our organization.

No other company could survive on margins like that. But a lot of starving people can.

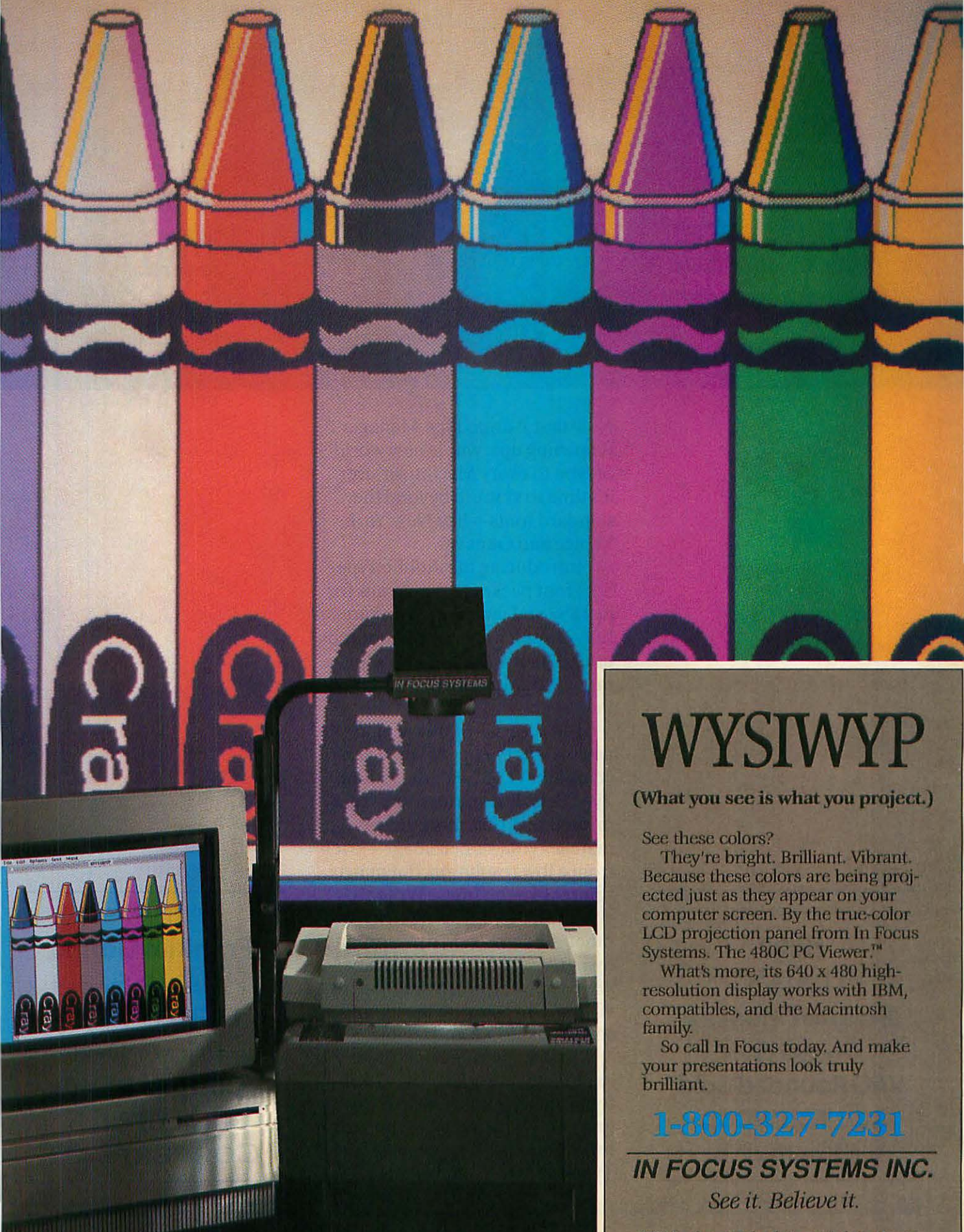
CARE

We're Helping People Learn To Live Without Us.
1-800-242-GIVE

PRODUCT COMPARISON

Product	V.	Req.	Rev.	Price	Product	V.	Req.	Rev.	Price
P51 Mustang Flight Simulator	2.04	512K/3.2	4/89	\$10	SmartScrap & The Clipper	2.0	1MB/6.03	8/89	\$20
PacerLink	5.0	512K/5.0	*		Snap ★	3.1	1MB/3.0	9/89	*
Panorama	1.1	1MB/4.2	5/89	Free	SoftPC Mac ★	1.3	2MB/6.0	*	
PEGASYS II	3.2	1MB/6.03		Free	Sound Designer	1.5	512K/6.03		\$45
Performer	3.2	1MB/6.0		Free	Universal ★				
Sequencer ★					Spellsweil ★	2.3	512K/3.2		*
Personal	2.0	512K/3.2	2/90	Free	Springboard	2.0	1MB/6.0		*
Golf Stats					Publisher				
Personal	2.0	1MB/6.0		\$10	Stopping Out II	2.0	1MB/4.1	4/89	Free
Reference Catalog					StickyBusiness	1.06	512KE/6.03		Free
PICT Detective	2.0	512KE/6.0		\$20	Still Light	3.0	1MB/6.0		Free
PixelPaint ★	1.2	2MB/4.1		Free	StrataVision 3d ★	1.02	2MB/6.03		Free
Plains & Simple ★	1.06	1MB/3.2		*	Suitecase II	3.0	512KE/4.1	10/89	\$25
PowerDraw	3.0	1MB/6.0		*	Super 3d	2.0	512KE/6.02	10/89	\$200
PowerStation ★	2.5.2	512K/4.1		Free	SuperGlue II with GlueNotes	2.1	1MB/6.0	1/90	*
PowerTools	3.0	4MB/6.0		*	SuperLaserSpool	2.0	512K/4.1		\$20
Practica Musica	2.1	512K/3.2		\$10	SuperPaint	2.0	1MB/6.02	8/89	\$50
Printer	2.0	512K/6.02		\$22.50	SuperSpool	5.0	512K/4.1		\$20
Interface III					Synchronicity	2.0	512KE/3.2	12/89	\$5.00
Pro-Cite ★	1.3	512K/4.1		*	Systat ★	3.2	1MB/6.0		\$75
Professional	2.3	1MB/6.03		Free	Teacher's Rollbook ★	2.2	512K/3.2		\$17.95
Composer					Ternary Plot	3.0	512K/3.2		*
Professional	2.0	1MB/6.0		\$22	TextPort ★	3.01	1MB/6.0		Free
Image II					Think C	4.0	1MB/5.0	2/90	*
PropsForms	2.0	1MB/6.03		Free	Timbuktu	3.0	1MB/4.1		Free
Prototypier ★	2.01	1MB/4.1	9/89	\$79	TimeMinder	2.0	1MB/4.2	9/89	\$50
Publish or Parish	3.0	512KE/3.2		\$10	Timeslips III	1.2	512KE/4.2	2/90	\$50
Pyro ★	3.31	512K/4.1		\$10	TML Pascal II	3.0	1MB/5.0	6/89	\$79.95
QuarkXPress	2.1	1MB/6.02	1/89	*	TMON ★	2.8.1	512K/4.0		*
Quicken ★	1.5	512K/3.2	1/90	*	TOPS/Mac	2.1	512K/3.2		*
QuickLetter ★	1.01	512KE/3.2	10/89	Free	Trapaze ★	2.1	1MB/6.0		\$35
QuickMail	2.0	512KE/3.2		*	TrueBASIC ★	2.02	1MB/6.0		Free
QuickShare	2.0	512KE/3.2		\$75	TrueForm ★	1.1	1MB/6.2	4/90	Free
QuickShot ★	2.1	1MB/4.2		\$5	Turbosynth	2.0	1MB/6.03		\$35
Read-It OCR	2.1	1MB/6.03	12/89	*	UNITize ★	1.3	512KE/3.2	10/89	\$20
Reports ★	1.2	1MB/6.0		Free	VersaCAD/	2.11	1MB/6.0		Free
Retail Engine	3.0	1MB/6.0		*	Macintosh Edition ★				
Sales Associate	1.10	1MB/6.03		Free	Virex ★	2.2	1MB/4.2	1/90	*
SAM	1.1	512KE/3.2	12/89	*	Virtual	2.0	1MB/3.2	10/89	Free
ScheduleMaker	3.0	1MB/6.0		\$25	VMacS	2.0	1MB/6.0		\$25
ScreenSnap ★	2.2	1MB/4.2		*	Wall Street Investor	3.0	1MB/5.0		\$150
ScriptEdit	1.1	1MB/6.04		*	Wingz ★	1.1	1MB/6.0	6/89	Free
Sentinel	2.0	512K/4.1		\$20	Word Finder	2.0	512K/3.2		*
Shanghai	2.0	1MB/6.02	2/90	\$13	WordPerfect for the Macintosh ★	1.0.3	1MB/4.2		Free
SimpleSpan	2.5	512K/3.2		*	WorksPlus	2.0	1MB/6.03	1/90	*
Smart Alarms	2.9.1	512K/3.2		\$12	Spell				
SmartForm	1.1	1MB/6.0	7/89	Free	WriteNow	2.0	512K/3.2	5/89	*
Assistant ★									
SmartForm	1.1	1MB/6.0	7/89	Free					
Designer									

To have products listed in this section, send upgraded software, an outline of changes since the previous release (indicate if it's a maintenance upgrade), upgrade price, minimum RAM and system software, suggested retail price, company name, mailing address, and phone number to *Updates*, Macworld, 501 Second St., San Francisco, CA 94107.



WYSIWYP

(What you see is what you project.)

See these colors?

They're bright. Brilliant. Vibrant. Because these colors are being projected just as they appear on your computer screen. By the true-color LCD projection panel from In Focus Systems. The 480C PC Viewer.[™]

What's more, its 640 x 480 high-resolution display works with IBM, compatibles, and the Macintosh family.

So call In Focus today. And make your presentations look truly brilliant.

1-800-327-7231

IN FOCUS SYSTEMS INC.

See it. Believe it.

7770 Southwest Mohawk Street, Tualatin, Oregon 97062, 1-800-327-7231. In Oregon, 503-692-4968.

Circle 63 on reader service card

**Go beyond
New York,
Venice, and
Geneva**

**for
only
\$99.**

Now that Adobe Type Manager™ is opening up a whole new world of type to every Macintosh® user, it's time to venture beyond the standard fonts—like New York, Venice and Geneva.

Introducing the Adobe Type Set™ font packages. Each sells for just \$99 and includes seven carefully chosen fonts worth hundreds of dollars if we sold them separately. So your dollar goes further than ever.

But the really far-reaching news is what happens when you combine ATM™ with the Adobe Type Sets. For starters, you'll get printed text that more closely matches your screen image—even from a low resolution, dot matrix printer like the ImageWriter®. If you're an Apple LaserWriter® or other Adobe PostScript® printer owner, you'll be amazed at how your screen type can be scaled to virtually any size, on the fly, and still look smooth and legible.

So if you've been tempted to explore the wonderful world of fonts, this is your chance to travel first class. With a select group from the Adobe®
ADOBE®
Type Library.

Adobe Type Set 1:

Hobo
TRAJAN™
Bodoni Poster
Freestyle Script
VAG Rounded Bold
COTTONWOOD™
*Linotext**

Adobe Type Set 2:

Franklin Gothic®
Present Script*
LITHOS™ BOLD
PEIGNOT* DEMI
Cooper Black
JUNIPER™
COPPERPLATE



Adobe, the Adobe logo, PostScript and the PostScript logo are registered trademarks and Adobe Type Set, Adobe Type Manager, ATM, Cottonwood, Juniper, Lithos and Trajan are trademarks of Adobe Systems Incorporated in the U.S.A. Apple LaserWriter, ImageWriter and Macintosh are registered trademarks of Apple Computer, Inc. *Linotext, Peignot and Present are trademarks of Linotype AG and/or its subsidiaries. Franklin Gothic is a registered trademark of Kingsley/ATF Type Corp. © 1990 Adobe Systems Incorporated. All rights reserved.

WHERE TO BUY

This listing provides companies and phone numbers for products mentioned in this issue. Allow several weeks for responses to reader service card inquiries. Asterisks indicate vendors who prefer to be contacted by phone.

Reader Service

- 701 3DWorks/RenderWorks** MacroMind, Inc.; 415/442-0200.
- A**
- 702 America Online** Quantum Computer Services, Inc.; 703/448-8700, 800/227-6364.
- 703 The Animation Stand** Linker Systems, Inc.; 714/552-1904.
- 704 ArchiText** BrainPower, Inc.; 818/707-1712, 800/345-0519.
- 705 Audiomedia** Digidesign, Inc.; 415/327-8811, 800/333-2137.
- 706 Authorware Professional** Authorware, Inc.; 612/921-8555.
- 707 AVID/1 Media Composer** Avid Technology, Inc.; 617/221-6789.
- B**
- 708 The Big Picture E-Machines, Inc.**; 503/646-6699, 800/344-7274.
- 709 BigTime TV** Hyperpress Publishing Corp.; 415/345-4620.
- C**
- 710 Calculator Construction Set** Dubl-Click Software, Inc.; 818/700-9525.
- 711 ClearVue/II Display System, ClearVue/SE Display System** RasterOps Corp.; 408/562-4200, 800/468-7600.

Reader Service

- 713 ColorBoard 224, ColorBoard 232, ColorBoard 264** RasterOps Corp.; 408/562-4200, 800/468-7600.
- 716 Color Capture** Data Translation, Inc.; 508/481-3700.
- 717 ColorSnap-32** Computer Friends, Inc.; 503/626-2291, 800/547-3303.
- 719 ColorSpace II, ColorSpace FX** Mass Microsystems, Inc.; 408/522-1200, 800/522-7979.
- 720 Complete Undelete** 1stAid Software, Inc.; 617/783-7118, 800/843-3497.
- 721 Computer Eyes, Computer Eyes Pro Color Digitizer** Digital Vision, Inc.; 617/329-5400.
- 722 Course Builder** Tele-robotics International, Inc.; 615/690-5600.
- 723 Crystal View SE Display System, Crystal View II Display System, Crystal View SE-30 Display System** Taxan USA Corp.; 408/946-3400, 800/829-2641.

D

- * D5-SCX Video Scan Converter** Dimension 5, Inc.; 503/293-7775.
- 724 DataFrame XP100** SuperMac Technology; 408/245-2202.
- 725 DeskPaint and DeskDraw** Zedcor, Inc.; 602/881-8101, 800/482-4567.
- 726 Digital Darkroom** Silicon Beach Software, Inc.; 619/695-6956.
- 727 DirectDrive 130** Jasmine Technologies, Inc.; 415/282-1111.
- 728 Double Helix** Odesta Corp.; 312/498-5615, 800/323-5423.
- 729 DQ-Animax** Diaquest, Inc.; 415/527-7700.

E

- 730 Electric Image Animation System** Electric Image;

Reader Service

- 312/498-5615, 800/323-5423.
- 731 Enhance** MicroFrontier, Inc.; 515/270-8109, 800/388-8109.
- F**
- 732 FrameGrabber 324NC** RasterOps Corp.; 408/562-4200, 800/468-7600.
- * Fujitsu RX7100PS** Fujitsu America, Inc.; 408/432-1300.

FONTS

- 733 18+ Fonts**; 708/980-0887.
- 734 Adobe Systems, Inc.**; 415/961-4400, 800/833-6687.
- 735 Agfa Compugraphic**; 508/658-5600, 800/822-5524.
- 736 Allotype Typographics**; 313/663-1989.
- 737 Alphabets, Inc.**; 312/328-2733.
- 738 Altsys Corp.**; 214/424-4888.
- 739 Bitstream Inc.**; 617/497-6222.
- 740 Casady & Greene, Inc.**; 408/624-8716, 800/359-4920.
- 741 Casey's Page Mill**; 303/220-1463, 800/544-5620.
- 742 Davka Corp.**; 312/944-4070, 800/621-8227.
- 743 Devonian International Software Co.**; 714/621-0973.
- 744 Dubl-Click Software, Inc.**; 818/700-9525.
- 745 Eastern Language Systems**; 801/377-4558.
- * Ecological Linguistics**; 202/546-5862.
- 746 EmDash**; 312/441-6699.
- 747 Emigre Fonts**; 415/845-9021.
- 748 The Font Company**; 602/996-6606, 800/442-3668.
- 749 Font World**; 716/235-6861.
- 750 Giampa Textware Corp.**; 604/253-0815, 800/663-8760.
- 751 Ingrimayne Software**; 219/866-6241.
- 752 Judith Sutcliffe: The Electric Typographer**; 805/966-7563.
- 753 Kingsley/ATF Type Corp.**; 602/325-5884, 800/289-8973.
- 754 Letraset Graphic Design Software**; 201/845-6100, 800/343-8973.
- 755 LetterPerfect**; 201/845-6100, 800/343-8973.
- 756 Linguist's Software, Inc.**; 206/775-1130.
- 757 Linotype Company**; 516/434-2000, 800/633-1900.
- 758 MacTography**; 301/424-3942.
- 759 Monotype Typography, Inc.**; 312/855-1440, 800/666-6893.
- * NeoScribe International, Inc.**; 315/853-4427.
- * Page Studio Graphics**; 602/839-2763.
- 760 Springboard Software**; 612/944-3915, 800/445-4780.
- 761 Studio 231**; 516/785-4422.
- 762 Tactic Software**; 305/378-4110, 800/344-4818.
- 763 T/Maker Co.**; 415/962-0195.
- 764 Treacyfaces, Inc.**; 215/896-0860.
- 765 Varsitytype**; 201/887-8000.
- 766 Zipatone TypeXpress**; 708/449-5500.
- G**
- 767 Genlock Converter** Julian Systems, Inc.; 415/686-4400.
- 768 Grayscale/Monochrome Display** SuperMac Technology; 408/245-2202.
- 769 GS II, GS 30** Generation X Technologies, Inc.; 408/739-4570, 800/448-8231.
- 771 Guide** OWL International, (continues)

Colorful

8-Bit Color
For \$495.

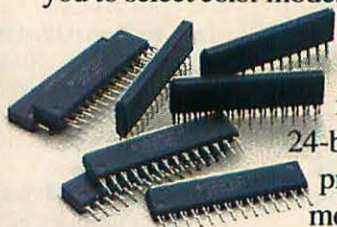
*“Let’s face it.
The world is not
black and white.
And why should it be
when RasterOps
can bring color
to the Macintosh
for less than \$500.”*

Finally, you can display 8-bit color on any Macintosh-compatible 640 x 480 monitor . . . without taking out a bank loan.

It’s called the RasterOps ColorBoard 208.

And it ushers your Macintosh into a world of brilliant color. Depending on your needs, the ColorBoard 208 allows you to select color modes of 2, 4, 16 and 256 colors.

What’s more, if you ever need 24-bit color, RasterOps protects your investment. By merely adding RasterOps’ user-installable memory modules to the ColorBoard 208’s existing sockets, you can upgrade to the ColorBoard 264. And in a matter of minutes you’ll be working with 24-bit color.



Impact.

*“I need 24-bit color
that screams.
RasterOps broke
technology barriers
to deliver the
world's most advanced
True Color board.
It's great!”*

24-Bit Color
Now \$795.

Simply stated, the ColorBoard 264 has revolutionized the state of 24-bit color on the Macintosh. In addition to its unbeatable price, the ColorBoard 264 represents the most advanced VLSI design ever offered. It's the fastest read/write cycle possible on a Macintosh, thanks to a video interface that provides 300 nanosecond cycles.

And the ColorBoard 264 offers dynamic support for your photorealistic images. You can instantly see the effects of the changes you make to your color image.

Now that you can afford True Color, use your Macintosh to make a colorful impact!

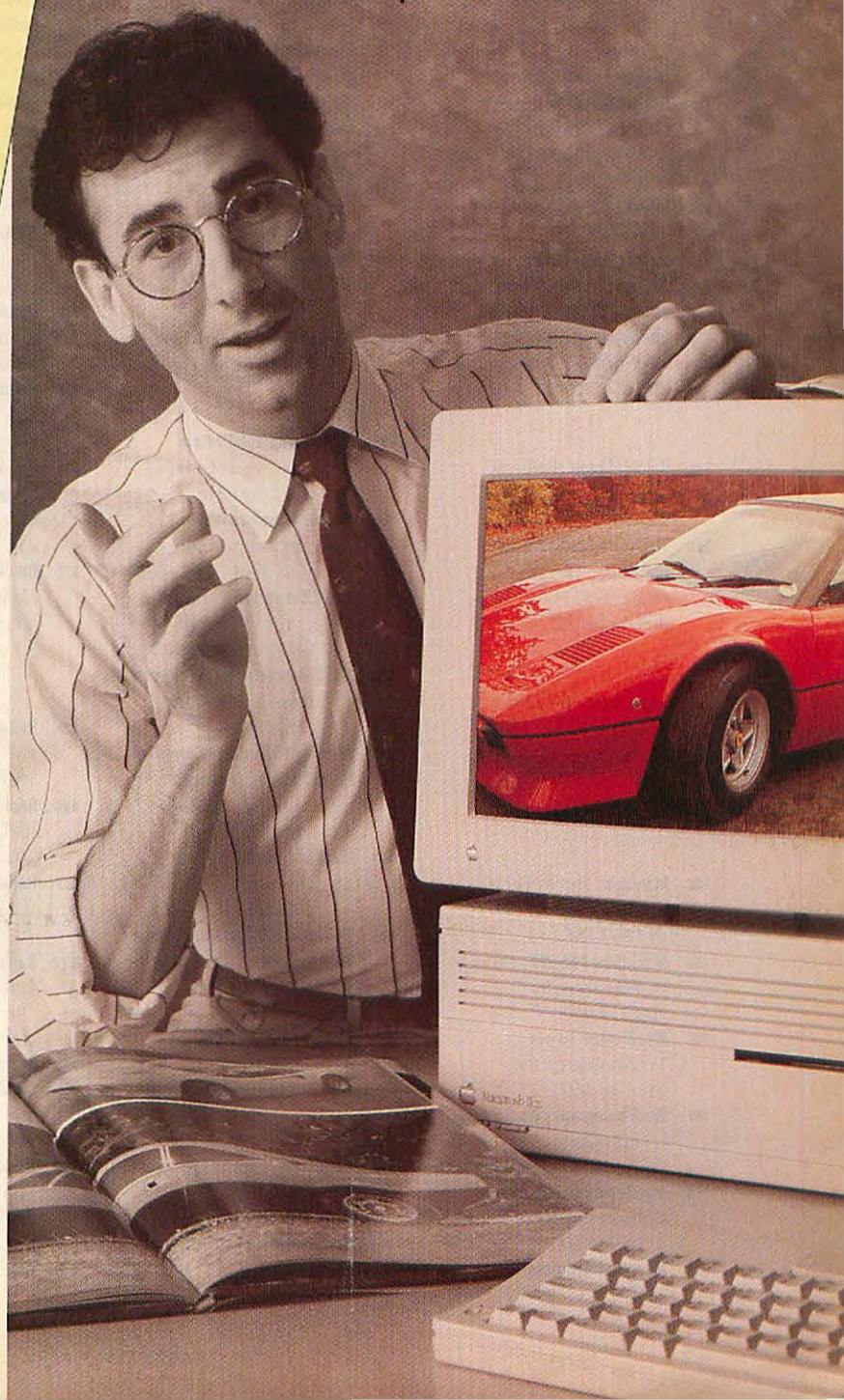
RasterOps

“We're changing the way people look at computers.”

2500 Walsh Road, Santa Clara, CA 95051 USA

Copyright 1990 RasterOps Corporation. RasterOps and ColorBoard are trademarks of RasterOps Corporation. All other brand names are protected by the trademark holder.

**Call RasterOps HOTLINE 1-800-468-7600
for more information.**



Reader Service

Inc.; 206/747-3203.



- 772 **HandOff** Software Innovations, Inc.; 214/727-2329.
- 773 **High Resolution Monochrome Monitor** Apple Computer, Inc.; 408/996-1010.
- 774 **HyperAnimator** Bright Star Technology, Inc.; 206/451-3697.
- * **HyperCard Videodisc Toolkit** APDA-Apple Computer, Inc.; 800/282-2732.
- 775 **HyperVision** Pixelogic, Inc.; 617/938-7711.



Image Public domain.

- 776 **ImageStudio** Letraset Graphic Design Software; 201/845-6100, 800/343-8973.
- 777 **In/Out** CE Software, Inc.; 515/224-1995.
- 778 **InteractiveTeacher** American Intellware Corp.; 213/533-4040.
- 779 **interFACE** Bright Star Technology, Inc.; 206/451-3697.



- 780 **KaleidaGraph** Synergy Software, Inc.; 215/779-0522.
- 781 **The Kurta Studio for Aldus Products** Kurta Corp.; 602/276-5533, 800/445-8782.



- 782 **Leprechaun** Shodan; 415/849-9475.
- 783 **L-View** Sigma Designs; 415/770-0100, 800/933-9945.



- 784 **MacCalc** Bravo Technologies, Inc.; 415/841-8552.
- 785 **MacinStor 100-ZFP** Storage Dimensions, Inc.; 408/879-0300.
- 786 **MacMovies** Lapis Technologies, Inc.; 415/748-1600.
- 787 **MacPhotographyWorkshop** Joseph Ciaglia, Photographer; 215/985-1092.
- 788 **MacRecorder** Farallon Computing, Inc.; 415/596-9100.
- 789 **MacroMind Director,**

Reader Service

MacroMind Director Accelerator MacroMind, Inc.; 415/442-0200.

- 791 **MacSprint II** Orchid Technology; 415/683-0373, 800/767-2443.
- 792 **MacVision** Koala Technologies; 408/287-6311.
- 793 **MediaTracks** Farallon Computing, Inc.; 415/596-9100.
- 794 **MegaScreen 2008, MegaScreen 3008, MegaScreen SE/3001 Rival** MegaGraphics, Inc.; 805/484-3799, 800/423-0183.
- 797 **Mentor/MacVideo** Edudisc, Inc.; 615/373-2506.
- * **Microsoft File** Microsoft Corp.; 206/882-8080, 800/426-9400.
- 798 **MicroTV** Aapps Corp.; 408/735-8550.
- 799 **Midas I** Seehorn Technology, Inc.; 408/998-7961.
- 800 **Moonraker** Workstation Technologies, Inc.; 714/250-8983.
- 801 **MusicProse** Coda Music Software; 612/854-1288.



- 802 **NEC Monograph System** Relax Technology; 415/471-6112, 800/848-1313.
- 803 **Neotech Image Grabber** Advent Computer Products, Inc.; 619/942-8456.
- 804 **NTSC Converter** Orange Micro, Inc.; 714/779-2772, 800/223-8029.
- 805 **NTSC Converter for Macintosh II** Julian Systems, Inc.; 415/686-4400.
- 806 **Nutmeg 19, Nutmeg/Xerox Full Page Display** Nutmeg Systems, Inc.; 203/966-3226, 800/777-8439.
- 808 **Nuts & HyperBolts** Sterling Swift Software; 512/280-2431.
- 809 **NuVista 1MB System, NuVista 2MB System** Truevision, Inc.; 317/841-0332, 800/858-8783.
- 811 **NuVista 4MB System** Truevision, Inc.; 317/841-0332, 800/858-8783.



- 812 **PageView** Sigma Designs; 415/770-0100, 800/933-9945.
- 813 **Personal Vision** Orange Micro, Inc.; 714/779-2772,

Reader Service

800/223-8029.

- 814 **Personal Writer PW10 SL** Personal Writer, Inc.; 213/556-1001, 800/322-4744.
- 815 **PhotoPress** Blue Solutions, Inc.; 805/371-4521.
- 816 **PixelGrabber** Perceptics; 615/966-9200.
- 817 **Portrait Display** Apple Computer, Inc.; 408/996-1010.
- 818 **POS-IM** Ensign Systems, Inc.; 801-546-1616.
- * **Prodigy** Prodigy Services Co.; 914/993-8727.
- 819 **ProViz Video Color Converter, ProViz Video Scanner hw, ProViz Video Scanner color** Pixelogic, Inc.; 617/938-7711.
- 822 **Publish It** Timeworks; 312/948-9200, 800/535-9497.



- 823 **QMS-PS 820 turbo** QMS, Inc.; 205/633-4300, 800/631-2692.
- 824 **Quick Capture** Data Translation, Inc.; 508/481-3700.
- 825 **Quicken** Intuit, Inc.; 415/322-0573, 800/624-8742.
- 826 **Quicksilver Videodisc Editing System** Sundance Technology Group; 214/550-8338.
- 827 **QuickView Z21, QuickView Z21 IQ** E-Machines, Inc.; 503/646-6699, 800/344-7274.



- 829 **Radius Accelerator 16** Radius, Inc.; 408/434-1010, 800/227-2795.
- 830 **Radius Accelerator 25** Radius, Inc.; 408/434-1010, 800/227-2795.
- 831 **Radius Full Page Display** Radius, Inc.; 408/434-1010, 800/227-2795.
- 832 **Radius Two Page Display System** Radius, Inc.; 408/434-1010, 800/227-2795.
- 833 **Radius Two Page Grayscale Display** Radius, Inc.; 408/434-1010, 800/227-2795.
- 834 **RamDisk+ 2.08** Roger Bates; 503/645-3930.
- * **RamStart 1.4** George A. Nelson; 54 Brattle St., Arlington, MA 02174.

Reader Service

- 835 **RasterOps SFX** RasterOps Corp.; 408/562-4200, 800/468-7600.
- 836 **RecordHolderPlus** Software Discoveries, Inc.; 203/872-1024, 800/437-5200.



- 837 **ShadowGraph** Personal Computer Peripherals Corp.; 813/884-3092, 800/622-2888.
- 838 **SilverView Grayscale** Sigma Designs; 415/770-0100, 800/933-9945.
- 839 **SilverView Monochrome** Sigma Designs; 415/770-0100, 800/933-9945.
- 840 **Sound Designer** Digi-design, Inc.; 415/327-8811, 800/333-2137.
- 841 **SpinnakerPlus** Spinnaker Software Corp.; 617/494-1200, 800/826-0706.
- 842 **Stepping Out II** Berkeley Systems, Inc.; 415/540-5536.
- 843 **Storyboarder** American Intellware, Inc.; 213/533-4040.
- 844 **StrataVision 3D** Strata, Inc.; 801/628-5218, 800/869-6855.
- 845 **Studio/1** Electronic Arts; 415/571-7171, 800/245-4525.
- 846 **SuperCard** Silicon Beach Software, Inc.; 619/695-6956.



- 847 **Traveller 40Mac** Aströ Systems, Inc.; 408/727-5599.
- 848 **TrueForm** Adobe Systems, Inc.; 415/961-4400, 800/833-6687.
- 849 **Two Page Monochrome Monitor** Ehman, Inc.; 307/789-3830, 800/257-1666.
- 850 **Two-Page Monochrome** Apple Computer, Inc.; 408/996-1010.



- 851 **UltraPaint** Deneba Software; 305/594-6965, 800/622-6827.



- 852 **Video Builder, Video Builder** (continues)

When **LaserMAX** Made Headlines Lino Also Made the Paper.

This ad was set
at 1000 x 1000
TurboRes on
plain paper!



LaserMAX Announces TurboRes™

On November 13, 1989, LaserMAX made headlines when we announced TurboRes. This patent-pending printer enhancement allows LaserMAX to *dramatically* increase laser printer resolution. Our proprietary new technology lets us control the size of the pixels on the printed page, eliminating the coarse steps between pixels (which ordinarily show up as jagged edges on type printed at low, 300-dpi resolution). Instead, TurboRes creates plain-paper typesetting that rivals phototypesetting—so you won't need to go to Lino any more.

TurboRes enhances the capabilities of all LaserMAX products, which come complete with 35 standard typefaces, and work with the Macintosh II, IIfx, ILCx, ILCi, and beyond.

Goodbye NTX, Hello NTQ

If you already own an Apple LaserWriter, you're in luck. With a LaserMAX MX6 controller you can boost your resolution from 300 dpi all the way up to 800 x 800 TurboRes for Near Typeset Quality.



The MAXimum

If you're the type who never settles for less than the MAX, you'll want the LaserMAX 1000. With 1000 x 1000 TurboRes, you'll need a printer's loupe to prove that the output isn't traditional typesetting. But unlike phototypesetting, the LaserMAX 1000 is:

- Low-cost (only pennies per page),
- Low-maintenance (no toxic chemicals),
- Very affordable (\$7995).

Free Sample Output

To learn more about the magic of LaserMAX with TurboRes, call us now at (612) 944-9696. We'll send you a page of actual output so you can see just how good TurboRes really is. Then you can decide for yourself which you'd rather have: the technology that lets you make tomorrow's headlines, or yesterday's classifieds.

LM LASERMAX
SYSTEMS™

7150 Shady Oak Road
Eden Prairie, MN 55344
FAX: (612)-944-9151

TurboRes™ is a trademark and patent-pending technology of LaserMaster Corporation. TurboRes enables 1000 x 1000 Plain-Paper Typesetting—Fast. Macintosh and LaserWriter are registered trademarks of Apple Computer Inc.

PINPOINT YOUR PROSPECTS.

*Advertisers
interested in
renting
MACWORLD's
Subscriber List,
Please call
Kevin Normandeau
IDG List Services
1.800.343.6474
for MA 508.879.0700*

WHERE TO BUY

Reader Service

- Color** Telerobotics International, Inc.; 615/690-5600.
- 854 VideoWorks II, VideoWorks II HyperCard Driver** MacroMind, Inc.; 415/442-0200.
- 856 VIDI/O Box (NTSC Version)** Truevision, Inc.; 317/841-0332, 800/858-8783.
- 857 VIDI/O Box (PAL Version)** Truevision, Inc.; 317/841-0332, 800/858-8783.
- 858 Virtual 2.0** Connectix Corp.; 415/324-0727.
- 859 Voice Navigator** Articulate Systems; 617/876-5236, 800/443-7077.
- 860 Voice Navigator XA** Articulate Systems; 617/876-5236, 800/443-7077.
- 861 The Voyager CD AudioStack** The Voyager Company; 213/451-1383.
- 862 The Voyager Video**

Reader Service

- Stack 2.1** The Voyager Company; 213/451-1383.
- W**
- 863 Wacom SD-420L** Wacom, Inc.; 201/265-4226, 800/922-6635.
- 864 The Worx** Julian Systems, Inc.; 415/686-4400.
- 865 WriteNow 2.0** T/Maker Co.; 415/962-0195 **M**
- Public domain software, freeware, and shareware are available through online information services; user groups (call 800/538-9696 ext. 500 for information on a local user group); or mail-order clearinghouses such as Budgetbytes (800/356-3551 for orders, 913/271-6022 in Kansas), Educomp (800/843-9497, 619/259-0255 in California), or the Public Domain Exchange (800/331-8125, 408/496-0624 in California).

Don't Forget!



Send for the latest edition of the free Consumer Information Catalog. ☐ The Catalog lists over 200 selected federal publications of consumer interest on subjects like health, nutrition, federal benefits, money management. ☐ The Catalog is free and so are many of the booklets. ☐ Just send your name and address, no strings attached. Write today:



**Consumer Information Center
Department DF
Pueblo, Colorado 81009**

A public service of this publication and the Consumer Information Center of the U.S. General Services Administration.

Sure beats sneakers.



One of the oldest file transfer methods known to Mac is about to become obsolete. You can now forget about using your "sneaker network" to run disks and files between computers around the office.

Introducing LapLink Mac III, the fastest, easiest way to transfer files between Macs or between a Mac and a PC.

LapLink Mac III is very versatile and lets you move files at speeds of nearly 3 megabytes per minute.

That's fast. And it's also easy, thanks to a simple interface familiar to anyone who uses a Mac. Just select the files you want to transfer and click on the copy button.

The new LapLink Mac III comes in two versions. The **Connectivity Pac** gives you everything you need to transfer files between two Macs or a Mac and a PC. You get a universal cable that connects a Mac to a PC or to another Mac. An accelerator that boosts Mac-to-Mac file transfer speeds to up to 750,000 baud. File translators

that make it simple to convert word processing documents from Mac formats to PC formats—or vice versa. And the ability to transfer files between two users over your existing AppleTalk cables or remotely over a modem. All for just **\$189.95***.

The LapLink Mac III **Network Pac** lets you transfer files between five Macs on an AppleTalk network—without a dedicated file server or expensive hardware. Adding more users is as simple as buying more Network Pacs. And the Network Pac's suggested retail price of **\$299.95*** works out to just **\$60 per user**. Not bad for a package that includes three-level password protection and remote modem access.

For more information, including a LapLink Mac III brochure, call us at **(800) 662-2652**, extension 202.

After all, why run your files around when you can use your computer?

MACWORLD EXPOSITION

See us at Brooks Hall-booth #5005

*Manufacturer's suggested retail price

© Copyright 1990, Traveling Software, Inc. LapLink, LapLink Mac, and Traveling Software are registered trademarks and LapLink Mac Accelerator, Connectivity Pac, and Network Pac are trademarks of Traveling Software, Inc. Apple, Macintosh, AppleTalk, and Mac are registered trademarks of Apple Computer, Inc.

LAPLINK Mac



Traveling Software

16702 North Creek Parkway, Bothell, WA 98011 • (206) 483-0039

MEET YOUR NEW MIS DEPARTMENT



Tomorrow's leaders are being shaped by two of the most powerful forces in America today. Computers and You.

In an unprecedented way, the computer industry is bringing technology and learning to neighborhoods more commonly associated with hardship than hardware. In San Francisco's Tenderloin, kids have given up graffiti to study PC architecture, graphics and desktop publishing. They work in a learning center equipped with Apple® computers and IBM® PC-compatible systems, as well as an impressive and growing software library, all provided through donations. And they're learning from volunteer instructors like David Bunnell and Adam Osborne.

The goal of Computers and You is to make a difference through technology. And it's working. By the end of the first quarter, students had already found jobs. For some, their first ever. And it doesn't stop with the Tenderloin. Our vision is to fully develop the San Francisco center and then recreate it in cities across the U.S.

A donation of equipment, time and especially money from you or your company can help make this vision a reality. To find out how, call us at (415) 922-7593. Computers and You, 330 Ellis St., 6th Fl., San Francisco, CA 94102.



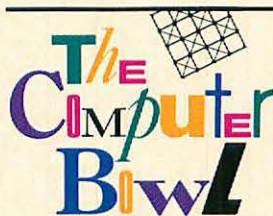
A Nonprofit
Community
Learning Center
at Glide
Memorial
Church

Apple and IBM are registered trademarks of their respective owners.

INDUSTRY FEEDING THE FUTURE ONE BYTE AT A TIME

ON APRIL 27, SOME OF THE BRIGHTEST MINDS IN THE COMPUTER INDUSTRY ARE GOING TO GET FIRED.

Fired with questions at The Computer Museum's Second Annual Computer Bowl. The computer industry's best and brightest from East and West will take their battle positions in a mind-bending quiz game. It's designed to educate, stimulate, and just plain fire up the feisty competitive spirit of the industry's hottest in the ultimate computer challenge. □ Ready. Aim. Let the game begin. □ Live at the World Trade Center, Boston, Massachusetts. Satellite broadcast to TECHMART, Santa Clara, California.



Presented by:
The Association
for Computing Machinery

East Coast Team:
Patrick J. McGovern, Captain
International Data Group
William E. Foster
Stratus Computer, Inc.

Bob Frankston
Lotus Development
Corporation
Edward Fredkin
Boston University
Russell E. Planitzer
Prime Computer, Inc.

West Coast Team:
L. John Doerr
Kleiner Perkins Caufield &
Byers

Stewart Alsop II
P. C. Letter
Bill Gates
Microsoft Corporation

Charles House
Hewlett-Packard Company
Lawrence G. Tesler
Apple Computer, Inc.

"The Examiner"
Mitchell Kapor
ON Technology, Inc.

Judges:
William Joy
Sun Microsystems, Inc.
John William Poduska, Sr.
Stardent Computer Inc.

Founders:
Pat Collins Nelson and
Dr. David Nelson

Underwriters:
Pat Collins Nelson
Official Sponsors:
Advanced Micro Devices
The Connectivity Chip
Company

BASF Corporation
The Diskette
Fenwick Partners, Inc.
The Search Firm
Lotus Development
Corporation
The PC Software Firm
Merrill Pickard Anderson &
Eyre
The Venture Capital Firm

Price Waterhouse
The Accounting Firm
Stratus Computer, Inc.
The Transaction Processor
Sun Microsystems, Inc.
The Workgroup
Computing Company
Thinx Software
The Intelligent Graphics
Software
Visix Software Inc.
The High Performance
Workstation Software

The Computer Bowl is a project to benefit the educational programs of The Computer Museum, 300 Congress Street, Boston, MA 02110
For tickets and sponsorship information (617) 426-2800 (415) 327-4749.

Creative: Commonwealth Creative Group/Carol Patch • **Typography:** Composing Room of New England • **Separations:** H. K. Graphics

PRODUCT INDEX

READER SERVICE
NUMBER

Software

BUSINESS

- 474 Absolute Solutions, 247
- Adobe, 180
- Aldus, 87-89
- Checkmark Software, 200
- 152 Fox Software, 215
- 157 Generic Software, 239
- 508 Innovative Data Design, 205
- Intuit, 33
- 7 Mainstay, 176
- Microsoft, IFC-1, 100-101, 189
- 87 Monogram Software, Inc., 106
- 352 Odesta, 32
- 370 ON Technology, 169
- 229 Paracomp, 44
- 42 Personal Training Systems, 25
- SAS Institute, 29
- 297 Shana Corporation, 102
- 302 Symmetry, 191
- 332 T/Maker, 5
- 153 TBSP, 12

VERTICAL

- 474 Absolute Solutions, 247
- Checkmark Software, 200
- 42 Personal Training Systems, 25
- 153 TBSP, 12

DATA MANAGEMENT

- 47 Blyth Software, 4
- 352 Odesta, 32
- 297 Shana Corporation, 102

WORD PROCESSING

- 496 Claris, 16
- 396 Sensible Software, 24
- 332 T/Maker, 5

CAD/CAM

- 157 Generic Software, 239
- 177 Graphsoft, Inc., 241
- 508 Innovative Data Design, 205
- 34 MathSoft, Inc., 187

COMMUNICATION

- CE Software, 22
- CheckFree Technologies, 39
- 281 DataViz, 70
- 287 Pinnacle Micro, 96
- 184 Prometheus, 251
- 286 Synergy, 221
- 304 Traveling Software, 265

EDUCATIONAL

- 42 Personal Training Systems, 25

Fonts

- Adobe, 180, 258
- 511 Bitstream, 74
- 231 Broderbund, 182
- 240 Broderbund, 182
- Image Club, 34, 50
- 200 Postcraft International, 45
- 211 TypeXpress, 68

Graphics/Desktop Publishing

- Adobe, 180, 258
- 460 Agfa-Compugraphic, 184-185
- Aldus, 87-89
- 35 Altys, 76
- 472 Ashlar, 202
- 511 Bitstream, 74
- 231 Broderbund, 182
- 240 Broderbund, 182
- 15 Cricket, 36-37
- 346 Deneba Software, 234
- 512 Emerald City Software, 249

READER SERVICE
NUMBER

- 513 Emerald City Software, 249
- 18 Emerald City Software, 218
- 212 Emerald City Software, 218
- 157 Generic Software, 239
- 177 Graphsoft, Inc., 241
- Image Club, 34, 50
- 508 Innovative Data Design, 205
- 342 Lasermax, 263
- 229 Paracomp, 44
- 200 Postcraft International, 45
- Raster Ops, 260-261
- 297 Shana Corporation, 102
- 266 Silicon Beach Software, 41
- 504 Strata, 175
- 190 Supremac Technology, 47
- 476 Teletypesetting, 246

PERSONAL BUSINESS/HOME

- 474 Absolute Solutions, 247
- CheckFree Technologies, 39
- Intuit, 33

ENTERTAINMENT

- 134 Casady & Greene, 8
- 200 Postcraft International, 45

NETWORKING

- 69 Insignia Solutions, 38
- 304 Traveling Software, 265

UTILITIES

- CE Software, 178
- Central Point Software, 221
- 357 Central Point Software, 245
- 364 Fifth Generation Systems, 98
- 250 Fifth Generation Systems, 104
- 439 GDT Softworks, 46
- 237 Symantec, 83, 85

MISCELLANEOUS

- Aldus, 87-89
- 16 Casady & Greene, 8
- Checkmark Software, 200
- 439 GDT Softworks, 46
- 153 TBSP, 12

Hardware

COMPUTER SYSTEMS

- 509 Hardware Express, 270
- 58 MacFriends, 28
- 109 MacFriends, 52
- 361 MacFriends, 193
- 86 MacFriends, 250

PRINTERS

- 460 Agfa-Compugraphic, 184-185
- 271 Diconix, 56-57
- 204 GCC Technologies, 53
- 343 Hewlett Packard, 210-211
- 344 Hewlett Packard, 212-213
- 145 La Cie, 26-27
- 342 Lasermax, 263
- 424 Mirror Technologies, 72-73
- 409 Newgen, 84
- 143 Tektronix, 194
- 118 Zericon, 251
- 267 Zericon, 251

BOARDS

- 403 American Micro Distributors, 46
- 404 Daystar Digital, 94
- 477 Daystar Digital, 94
- 342 Lasermax, 263
- 427 Microtek, 214
- 196 National Semiconductor, 237
- 108 Orange Micro, 19
- Raster Ops, 260-261

READER SERVICE
NUMBER

DIGITIZERS/SCANNERS

- 289 Abaton, 252
- 294 Abaton, 252
- 460 Agfa-Compugraphic, 184-185
- 230 Caere Corporation, 42-43
- 122 Calcomp, 78-79
- 343 Hewlett Packard, 210-211
- 344 Hewlett Packard, 212-213
- 427 Microtek, 214
- 507 Wacom Co., Ltd., 48-49

DISPLAY

- 101 E-Machines, 161
- 154 Ehman, Inc., C3-C4
- 500 Ehman, Inc., C5
- 63 In-Focus, 257
- 58 MacFriends, 28
- 109 MacFriends, 52
- 361 MacFriends, 193
- 86 MacFriends, 250
- Magnavox, 173
- 424 Mirror Technologies, 72-73
- 46 Radius, 9-11

MODEMS

- 61 Computer Friends, 270
- 145 La Cie, 26-27
- 184 Prometheus, 251
- Shiva, 13

HARD DISKS/STORAGE

- 403 American Micro Distributors, 46
- 41 Braemar Corp, 40
- 217 Braemar Corp, 40
- 85 Ehman, Inc., C3-C4
- 500 Ehman, Inc., C5
- 308 GCC Technologies, 55
- 192 IDS Systems, 171
- 260 Iomega, 20-21
- 145 La Cie, 26-27
- 224 Liberty Systems, 269
- 465 MacProducts, 279
- 207 Mass Micro Systems, 35
- 263 Maynard Electronics Corp., 82
- 275 MicroNet Technology, 242
- 398 MicroNet Technology, 255
- 458 Microtech International, 80
- 424 Mirror Technologies, 72-73
- 287 Pinnacle Micro, 96
- 149 Rodime, 208
- Seagate, 92
- 321 Tecmar, 196
- Universal MacProducts, 206

VIDEO

- 465 MacProducts, 279
- 108 Orange Micro, 19
- Raster Ops, 260-261
- 190 Supremac Technology, 47

SECURITY DEVICES

- 463 Software Security, Inc., 75

MISCELLANEOUS

- 403 American Micro Distributors, 46
- 171 Computer Accessories, 77
- 61 Computer Friends, 270
- 63 In-Focus, 257
- 503 Kennet, 237
- 426 Microtouch, 216-217
- 449 Microtouch, 216-217
- Next Computer, 6-7
- 304 Traveling Software, 265
- 514 XeTel, 91

Accessories

FLOPPY DISKS/HOLDERS

- 402 3M, 14-15

READER SERVICE
NUMBER

SERVICES

- CheckFree Technologies, 39
- 406 MacAcademy, 69
- 293 Safeware, 246

MISCELLANEOUS

- 319 Compuserve, 207
- 61 Computer Friends, 270
- Kensington Microware, 198
- 30 Kensington Microware, BC
- 239 Secure-It, 40

Mail Order

- 5 Beverly Hills Computer, 278
- 32 CDA Computer Sales, 86
- 79 Diskette Connection, 271
- 368 Dr. Mac, 274-275
- Hard Drives, 277
- 509 Hardware Express, 270
- 224 Liberty Systems, 269
- MacConnection, 58-67
- 498 MacExpress, 276
- 58 MacFriends, 28
- 109 MacFriends, 52
- 361 MacFriends, 193
- 86 MacFriends, 250
- 264 MacLand, 272-273
- 465 MacProducts, 279
- 78 MacWarehouse, 280-281
- 440 MacWarehouse, 280-281
- 70 MacZone, The, 108-115
- 44 Programs Plus, 162-165
- 442 Texas Mac Express, 271

MACWORLD

FREE PRODUCT INFORMATION

1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30
31 32 33 34 35 36 37 38 39 40
41 42 43 44 45 46 47 48 49 50

51 52 53 54 55 56 57 58 59 60
61 62 63 64 65 66 67 68 69 70
71 72 73 74 75 76 77 78 79 80
81 82 83 84 85 86 87 88 89 90
91 92 93 94 95 96 97 98 99 100

101 102 103 104 105 106 107 108 109 110
111 112 113 114 115 116 117 118 119 120
121 122 123 124 125 126 127 128 129 130
131 132 133 134 135 136 137 138 139 140
141 142 143 144 145 146 147 148 149 150

151 152 153 154 155 156 157 158 159 160
161 162 163 164 165 166 167 168 169 170
171 172 173 174 175 176 177 178 179 180
181 182 183 184 185 186 187 188 189 190
191 192 193 194 195 196 197 198 199 200

201 202 203 204 205 206 207 208 209 210
211 212 213 214 215 216 217 218 219 220
221 222 223 224 225 226 227 228 229 230
231 232 233 234 235 236 237 238 239 240
241 242 243 244 245 246 247 248 249 250

251 252 253 254 255 256 257 258 259 260
261 262 263 264 265 266 267 268 269 270
271 272 273 274 275 276 277 278 279 280
281 282 283 284 285 286 287 288 289 290
291 292 293 294 295 296 297 298 299 300

301 302 303 304 305 306 307 308 309 310
311 312 313 314 315 316 317 318 319 320
321 322 323 324 325 326 327 328 329 330
331 332 333 334 335 336 337 338 339 340
341 342 343 344 345 346 347 348 349 350

351 352 353 354 355 356 357 358 359 360
361 362 363 364 365 366 367 368 369 370
371 372 373 374 375 376 377 378 379 380
381 382 383 384 385 386 387 388 389 390
391 392 393 394 395 396 397 398 399 400

401 402 403 404 405 406 407 408 409 410
411 412 413 414 415 416 417 418 419 420
421 422 423 424 425 426 427 428 429 430
431 432 433 434 435 436 437 438 439 440
441 442 443 444 445 446 447 448 449 450

451 452 453 454 455 456 457 458 459 460
461 462 463 464 465 466 467 468 469 470
471 472 473 474 475 476 477 478 479 480
481 482 483 484 485 486 487 488 489 490
491 492 493 494 495 496 497 498 499 500

501 502 503 504 505 506 507 508 509 510
511 512 513 514 515 516 517 518 519 520
521 522 523 524 525 526 527 528 529 530
531 532 533 534 535 536 537 538 539 540
541 542 543 544 545 546 547 548 549 550

CATALOG INFORMATION

551 552 553 554 555 556 557 558 559 560
561 562 563 564 565 566 567 568 569 570
571 572 573 574 575 576 577 578 579 580
581 582 583 584 585 586 587 588 589 590
591 592 593 594 595 596 597 598 599 600

601 602 603 604 605 606 607 608 609 610
611 612 613 614 615 616 617 618 619 620
621 622 623 624 625 626 627 628 629 630
631 632 633 634 635 636 637 638 639 640
641 642 643 644 645 646 647 648 649 650

651 652 653 654 655 656 657 658 659 660
661 662 663 664 665 666 667 668 669 670
671 672 673 674 675 676 677 678 679 680
681 682 683 684 685 686 687 688 689 690
691 692 693 694 695 696 697 698 699 700

WHERE TO BUY

701 702 703 704 705 706 707 708 709 710
711 712 713 714 715 716 717 718 719 720
721 722 723 724 725 726 727 728 729 730
731 732 733 734 735 736 737 738 739 740
741 742 743 744 745 746 747 748 749 750

751 752 753 754 755 756 757 758 759 760
761 762 763 764 765 766 767 768 769 770
771 772 773 774 775 776 777 778 779 780
781 782 783 784 785 786 787 788 789 790
791 792 793 794 795 796 797 798 799 800

801 802 803 804 805 806 807 808 809 810
811 812 813 814 815 816 817 818 819 820
821 822 823 824 825 826 827 828 829 830
831 832 833 834 835 836 837 838 839 840
841 842 843 844 845 846 847 848 849 850

851 852 853 854 855 856 857 858 859 860
861 862 863 864 865 866 867 868 869 870
871 872 873 874 875 876 877 878 879 880
881 882 883 884 885 886 887 888 889 890
891 892 893 894 895 896 897 898 899 900

Please print or type all information

Name Title

Company

Address

City, State, Zip (Zip code needed to ensure delivery)

Phone: Area Code/Number Fax Number

☐ Check box and fill in the appropriate information to subscribe to Macworld. You will be billed \$24.95 for a 1-year (12 issue) subscription (U.S. only).

Expires 6/21/90

S 1

APRIL 1990

FREE PRODUCT INFORMATION

Get more valuable information about the products which interest you.

There's no cost; no obligation.

Simply print your name, title, address (with zip), telephone number and fax number (if available). Circle the numbers on the card for the products which interest you.

Mail the card. We pay the postage! For even faster results, fax to 413-637-4343.

Numbers for advertised products can be found in the ad and in both the Product Index and the Advertiser Index. Products mentioned editorially can be found in the "Where to Buy" section.

MACWORLD

FREE PRODUCT INFORMATION

1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30
31 32 33 34 35 36 37 38 39 40
41 42 43 44 45 46 47 48 49 50

51 52 53 54 55 56 57 58 59 60
61 62 63 64 65 66 67 68 69 70
71 72 73 74 75 76 77 78 79 80
81 82 83 84 85 86 87 88 89 90
91 92 93 94 95 96 97 98 99 100

101 102 103 104 105 106 107 108 109 110
111 112 113 114 115 116 117 118 119 120
121 122 123 124 125 126 127 128 129 130
131 132 133 134 135 136 137 138 139 140
141 142 143 144 145 146 147 148 149 150

151 152 153 154 155 156 157 158 159 160
161 162 163 164 165 166 167 168 169 170
171 172 173 174 175 176 177 178 179 180
181 182 183 184 185 186 187 188 189 190
191 192 193 194 195 196 197 198 199 200

201 202 203 204 205 206 207 208 209 210
211 212 213 214 215 216 217 218 219 220
221 222 223 224 225 226 227 228 229 230
231 232 233 234 235 236 237 238 239 240
241 242 243 244 245 246 247 248 249 250

251 252 253 254 255 256 257 258 259 260
261 262 263 264 265 266 267 268 269 270
271 272 273 274 275 276 277 278 279 280
281 282 283 284 285 286 287 288 289 290
291 292 293 294 295 296 297 298 299 300

301 302 303 304 305 306 307 308 309 310
311 312 313 314 315 316 317 318 319 320
321 322 323 324 325 326 327 328 329 330
331 332 333 334 335 336 337 338 339 340
341 342 343 344 345 346 347 348 349 350

351 352 353 354 355 356 357 358 359 360
361 362 363 364 365 366 367 368 369 370
371 372 373 374 375 376 377 378 379 380
381 382 383 384 385 386 387 388 389 390
391 392 393 394 395 396 397 398 399 400

401 402 403 404 405 406 407 408 409 410
411 412 413 414 415 416 417 418 419 420
421 422 423 424 425 426 427 428 429 430
431 432 433 434 435 436 437 438 439 440
441 442 443 444 445 446 447 448 449 450

451 452 453 454 455 456 457 458 459 460
461 462 463 464 465 466 467 468 469 470
471 472 473 474 475 476 477 478 479 480
481 482 483 484 485 486 487 488 489 490
491 492 493 494 495 496 497 498 499 500

501 502 503 504 505 506 507 508 509 510
511 512 513 514 515 516 517 518 519 520
521 522 523 524 525 526 527 528 529 530
531 532 533 534 535 536 537 538 539 540
541 542 543 544 545 546 547 548 549 550

CATALOG INFORMATION

551 552 553 554 555 556 557 558 559 560
561 562 563 564 565 566 567 568 569 570
571 572 573 574 575 576 577 578 579 580
581 582 583 584 585 586 587 588 589 590
591 592 593 594 595 596 597 598 599 600

601 602 603 604 605 606 607 608 609 610
611 612 613 614 615 616 617 618 619 620
621 622 623 624 625 626 627 628 629 630
631 632 633 634 635 636 637 638 639 640
641 642 643 644 645 646 647 648 649 650

651 652 653 654 655 656 657 658 659 660
661 662 663 664 665 666 667 668 669 670
671 672 673 674 675 676 677 678 679 680
681 682 683 684 685 686 687 688 689 690
691 692 693 694 695 696 697 698 699 700

WHERE TO BUY

701 702 703 704 705 706 707 708 709 710
711 712 713 714 715 716 717 718 719 720
721 722 723 724 725 726 727 728 729 730
731 732 733 734 735 736 737 738 739 740
741 742 743 744 745 746 747 748 749 750

751 752 753 754 755 756 757 758 759 760
761 762 763 764 765 766 767 768 769 770
771 772 773 774 775 776 777 778 779 780
781 782 783 784 785 786 787 788 789 790
791 792 793 794 795 796 797 798 799 800

801 802 803 804 805 806 807 808 809 810
811 812 813 814 815 816 817 818 819 820
821 822 823 824 825 826 827 828 829 830
831 832 833 834 835 836 837 838 839 840
841 842 843 844 845 846 847 848 849 850

851 852 853 854 855 856 857 858 859 860
861 862 863 864 865 866 867 868 869 870
871 872 873 874 875 876 877 878 879 880
881 882 883 884 885 886 887 888 889 890
891 892 893 894 895 896 897 898 899 900

Please print or type all information

Name Title

Company

Address

City, State, Zip (Zip code needed to ensure delivery)

Phone: Area Code/Number Fax Number

☐ Check box and fill in the appropriate information to subscribe to Macworld. You will be billed \$24.95 for a 1-year (12 issue) subscription (U.S. only).

Expires 6/21/90

S 2

APRIL 1990



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



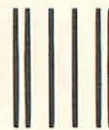
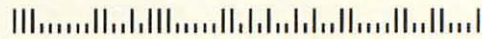
BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 215 PITTSFIELD, MA

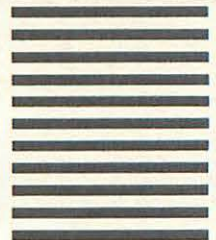
POSTAGE WILL BE PAID BY ADDRESSEE

MACWORLD

Reader Service Department
P.O. Box 5299
Pittsfield, MA 01203-9906



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 215 PITTSFIELD, MA

POSTAGE WILL BE PAID BY ADDRESSEE

MACWORLD

Reader Service Department
P.O. Box 5299
Pittsfield, MA 01203-9906



ADVERTISER INDEX

READER SERVICE
NUMBER

289 Abaton, 252
294 Abaton, 252
474 Absolute Solutions, 247
— Adobe, 180, 258
460 Agfa-Compugraphic, 184-185
— Aldus, 87-89
— Altsys, 76
403 American Micro Distributors, 46
472 Ashlar, 202
— Beverly Hills Computer, 278
511 Bitstream, 74
47 Blyth Software, 4
41 Braemar Corp., 40
217 Braemar Corp., 40
231 Broderbund, 182
240 Broderbund, 182
230 Caere Corporation, 42-43
122 Calcomp, 78-79
16 Casady & Greene, 8
134 Casady & Greene, 54
32 CDA Computer Sales, 86
— CE Software, 22, 178
— Central Point Software, 221
357 Central Point Software, 245
— CheckFree Technologies, 39
— Checkmark Software, 200
496 Claris, 16
85 CMS Enhancements, 30
319 Compuserve, 207
171 Computer Accessories, 77
61 Computer Friends, 270
15 Cricket, 36-37
281 DataViz, 70
404 Daystar Digital, 94
477 Daystar Digital, 94
346 Deneba Software, 234

READER SERVICE
NUMBER

271 Diconix, 56-57
79 Diskette Connection, 271
368 Dr. Mac, 274-275
101 E-Machines, 161
154 Ehman, Inc., C3-C4
500 Ehman, Inc., C5
512 Emerald City Software, 249
513 Emerald City Software, 249
18 Emerald City Software, 218
212 Emerald City Software, 218
364 Fifth Generation Systems, 98
250 Fifth Generation Systems, 104
152 Fox Software, 215
204 GCC Technologies, 53
308 GCC Technologies, 55
439 GDT Softworks, 46
157 Generic Software, 239
177 Graphsoft, Inc., 241
— Hard Drives, 277
509 Hardware Express, 270
343 Hewlett Packard, 210-211
344 Hewlett Packard, 212-213
192 IDS Systems, 171
— Image Club, 34, 50
63 In-Focus, 257
508 Innovative Data Design, 205
69 Insignia Solutions, 38
— Intuit, 33
— Invitational Computer
Conferences, 248
260 Iomega, 20-21
503 Kennect, 237
— Kensington Microware, 198
30 Kensington Microware, BC
145 La Cie, 26-27
342 Lasermax, 263

READER SERVICE
NUMBER

224 Liberty Systems, 269
406 MacAcademy, 69
— MacConnection, 58-67
498 MacExpress, 276
58 MacFriends, 28
109 MacFriends, 52
361 MacFriends, 193
86 MacFriends, 250
264 MacLand, 272-273
465 MacProducts, 279
78 MacWarehouse, 222-232
440 MacWarehouse, 280-281
— Macworld Expo, 237
70 MacZone, The, 108-115
— Magnavox, 173
7 Mainstay, 176
207 Mass Micro Systems, 35
34 MathSoft, Inc., 187
263 Maynard Electronics Corp., 82
275 MicroNet Technology, 242
398 MicroNet Technology, 255
— Microsoft, IFC-1, 100-101, 189
458 Microtech International, 80
427 Microtek, 214
426 Microtouch, 216-217
449 Microtouch, 216-217
424 Mirror Technologies, 72-73
87 Monogram Software, Inc., 106
196 National Semiconductor, 237
409 Newgen, 84
— Next Computer, 6-7
352 Odesta, 32
370 ON Technology, 169
108 Orange Micro, 19
229 Paracomp, 44
42 Personal Training Systems, 25

READER SERVICE
NUMBER

287 Pinnacle Micro, 96
200 Postcraft International, 45
44 Programs Plus, 162-165
184 Prometheus, 251
46 Radius, 9-11
— Raster Ops, 260-261
149 Rodime, 208
293 Safeware, 246
— SAS Institute, 29
— Seagate, 92
239 Secure-It, 40
396 Sensible Software, 24
297 Shana Corporation, 102
— Shiva, 13
266 Silicon Beach Software, 41
463 Software Security, Inc., 75
504 Strata, 175
190 Supermac Technology, 47
— Symantec, 83
237 Symantec, 85
302 Symmetry, 191
286 Synergy, 221
332 T/Maker, 5
153 TBSP, 12
321 Tecmar, 196
143 Tektronix, 194
476 Teletypesetting, 246
442 Texas Mac Express, 271
402 3M, 14-15
304 Traveling Software, 265
211 TypeXpress, 68
— Universal MacProducts, 206
507 Wacom Co., Ltd., 48-49
514 XeTel, 91
118 Zericon, 251
267 Zericon, 251

Having Problems With Your Subscription?

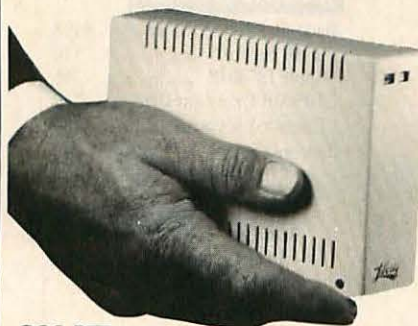
Please let us know.

Phone toll-free
800/525-0643.
From Colorado,
Alaska, Hawaii
and outside the
U.S., please phone
303/447-9330.

Portable Hard Drives

- Compact, measures only 2" x 5" x 7"
- Lightweight, under 3lbs.
- Durable 60 G shock rating

- 110-220 volt power supply option inside drive case
- Quiet connection cooled
- Fast, 12ms access,



200 MB

40 Quantum*	599 ⁰⁰
80 Quantum*	849 ⁰⁰
100 Conner*	899 ⁰⁰
105 Quantum*	999 ⁰⁰
200 Maxtor*	1599 ⁰⁰
International Power	50 ⁰⁰
Carrying Case	29 ⁰⁰

*Add 100⁰⁰ for Internal Power Supply

Liberty
Systems

The Affordable Portable
120 Saratoga Ave., Ste. 82, Santa Clara, CA 95051

**Call us today for
your free 30-day trial.**
(408) 983-1127

Never buy
another
ribbon with

MacInker

Each MacInker shipped complete with free ink bottle,
reservoir cover and ink dispenser



Over 125,000 sold
Free catalog

\$42.00
shipping \$4.50

MacInker™, the original,
automatic ribbon re-
inker. Model 2341M re-
inks Imagewriter I/II
black & single color car-
tridges. The Universal
MacInker re-inks hun-
dreds of cartridge types
(including the Imagewriter
LQ, one color and multi-
color) with suitable
adapters. Extra dark, dot
matrix, lubricant ink
yields better than new
print quality and extends

printhead life. New reservoir for precise ink metering. Average
number of re-inkings/cartridge is 60-100. With the optional
Multicolor Adapter (mod M422, \$40.00) your MacInker re-inks
4-color Imagewriter II cartridges. Full range of accessories
available, inks & cartridges, heat transfer, etc. Colors: red,
green, blue, yellow, purple, brown, orange, silver, gold, white.

Imagewriter I/II MacInker (mod 2341M).....	42.00		
Universal MacInker (includes one adapter).....	68.50		
Multicolor Adapter (mod M422).....	40.00		
Heat Transfer Adapter.....	25.00	HT cartridge	9.00
Imagewr. cartr. black.....	3.15/ea	4-color.....	10.00/ea
Imagewr. LQ cartr. black.....	14.00	4-color.....	20.00
Extra ink bottle black.....	3.00/ea	pint black.....	18.50

Data Switches, manual or automatic



4 port 8 pin manual	50.00
4 port automatic	149.00
4 port 9 pin manual	50.00
cables	16.00

Special Offer. Order for >60.00 and say: "I saw it in MacWorld" and get a free mousepad. Order for >\$100.00 and
get a free key chain, beeper and flashlight combined (a \$15.00 value) or get an accurate electronic pedometer, jog
and step meter with included calculator for \$12.00 (a \$40.00 value).

LightFax 9624

9600 b fax, 2400 b modem

**High Speed Fax and 2400
baud modem** in one compact
unit. 9600 baud fax (fully
Group 3 compatible) for fast
transmission and lower tele-
phone bills. **Fax directly
from your application.**
Cable/software included.
Powerful software includes **File
Queuing, Scheduled Sending,
Broadcasting, NameCard
Data Management.** Free "Facts on Faxes" bulletin.
LightFax 9624 (send and receive).....**499.00**
LightFax 9624 (send only version).....**399.00**



One year warranty
Shipping \$7.00

\$399.00

LightSpeed 9624E -9600 b Modem

V.32 - MNP class 5



\$799.00

Shipping \$7.00

- 9600/4800/2400/1200 bps full duplex data transfer
- V.32/V.22bis/V.22, Bell 212A compli-
ant, fully Hayes compatible
- MNP class 5 error correction and
data compression
- No proprietary protocols. Effective
throughput up to 19.2bps
- Auto speed detection
- Cable and software included

LightSpeed 9624E 9600 baud modem	799.00
LightSpeed 2400 baud modem	128.00

Order Toll Free 800-547-3303

In Oregon (503)626-2291

Computer Friends, Inc., 14250 NW Science Park Dr. Portland OR 97229
fax (503)643-5379 - telex 4949559 CF - AppleLink DO 438

Circle 61 on reader service card.

RasterOps™ 264 \$649

Macintosh

SE/30	2949
IIcx	3298
IIci	4498
Portable	4395
(w/40MB drive)	4895

Memory

1 MB (4 x 256)	200
4 MB	320
8 MB	640

Monitors

Apple 13" RGB	746
Apple Portrait	829
Radius	CALL
Sony 1302 Multiscan	699
19" Color Trinitron	2599

Our experienced Macintosh sales consultants will
help you configure a system to your exact needs.

Sample System

Macintosh IIci	4498
4 MB memory	320
Apple 13" RGB	746
105 MB Quantum Drive	749
Extended Keyboard	134
Delivered Price	\$6,447
(or lease \$165/mo.)	

Quantum Internals

40 MB (19 ms)	449
80 MB (19 ms)	679
105 MB (19 ms)	749
120 MB (15 ms)	949
170 MB (15 ms)	1149

RasterOps

ColorBoard 264	649
ColorBoard 264/SE30	898
ColorBoard 232 SFX	3098
ColorBoard 224 SFX	3798
ColorBoard 108+	849
ColorBoard 108+/SE30	998
FrameGrabber 324NC	1598
ClearVue/GS	1649

No surcharge for credit cards or COD's. Free ground
shipping in continental United States. Second day air
only \$3.00 for packages under 20 lbs. Texas residents
please add 7.75% sales tax.
Leasing available to qualified businesses. Sample sys-
tem lease price based on 60 month true lease. Sorry, we
cannot accept purchase orders.

512/448-1911 FAX 512/448-0825

1-800/622-4739

Prices subject to change (usually down). Although we are not an authorized Apple dealer, we will repair or replace any
Apple equipment during the warranty. All merchandise is guaranteed new, unused, and covered by original manufacturer's
warranty. 'Apple', 'Macintosh', 'Quantum', 'RasterOps', 'Radius', and 'Sony' are trademarks of their respective companies.

HARDWARE EXPRESS

6800 Westgate Blvd., Suite 139 Dept. 325, Austin, TX 78745

Circle 509 on reader service card.

Ad
Circle 4

LEARN HOW TO JUMP- START A LIFE.

Learn
Red Cross
CPR.



TEXAS MAC EXPRESS

MAC SYSTEMS

MAC SE

Mac SE, 40 mb Internal,
2 mb RAM, FDHD Drive,
Extended Keyboard

\$2,399

MAC IIcx

Mac IIcx, 40 mb Internal,
5 mb RAM, 8 bit color,
14" Color Monitor,
Extended Keyboard

\$4,999.

SE/30

SE/30, 105mb Quantum,
Extended Keyboard,
5mb RAM

\$4,099.

MAC PORTABLE

\$4,349.

with Apple 40mb Internal

\$4,849.

ACCELERATORS

NOVY MAC-030

System 7.0 Compatible

For Macintosh 512KE, Plus & SE

Motorola 68030 16mhz Processor, PMMU

NovyMac 030 16mhz **\$699**

NovyMac 030 25mhz **\$999**

68882 16mhz CoProcessor **\$199**

Supplemental Power Supply **\$125**

One Meg SIMMs **\$69**

Ricoh 6000/PS **\$2,395**

Toll Free Technical Support

No Surcharge



1-800-MAC-STUF

9000 Lodge Court • Austin, Texas 78758

(800) 622-7883 • FAX (512) 339-6950

Circle 442 on reader service card.

maxell.

5¼" DS
5⁹⁵
PER BOX

5¼" HD
10⁹⁵
PER BOX

3.5" DS
8⁹⁵
PER BOX

3.5" HD
17⁹⁵
PER BOX

SONY

3½" DS
8⁹⁵
PER BOX

3½" HD
17⁹⁵
PER BOX

*Bulk
Diskettes*

PER EA.
Min. 50

3.5" DS - **.49**

3.5" HD - **1.49**

3M

Authorized Distributor Magnetic Media Division

5¼" DD
5⁹⁵
PER BOX

5¼" HD
10⁹⁵
PER BOX

3½" DS
8⁹⁵
PER BOX

3½" HD
17⁹⁵
PER BOX

"Old Reliable"

Diskette Connection

NORTHWEST 1-800-451-1849

PO BOX 10247, WILMINGTON, DE. 19580

SOUTHEAST 1-800-940-4600

PO BOX 4163, DEERFIELD BEACH, FL. 33442

MIDWEST 1-800-654-4058

PO BOX 1674, BETHANY, OK. 73008

WEST 1-800-621-6221

PO BOX 12396, LAS VEGAS, NV. 89112

Minimum Order \$20.00 NO SURCHARGE on VISA / MC

COD orders add \$3.00 UPS Surface shipping add \$4.00

per each 100 Disks (First Class US Mail delivery extra)

(Prices are subject to change without notice)

VISA

FAX

(405) 495-4598

Circle 79 on reader service card.

Sale!

MacLandTM

America's Largest Macintosh Hardware Source

Prices good through April 1990

Externals

	Retail Price	Sale Price
20 Megabyte		
CMS Enhancements 20 32ms	\$725-	\$429.
Seagate 20 32ms	\$725-	\$359.
30 Megabyte		
Caché Systems 30 28ms	\$799-	\$489.
CMS Enhancements 30 32ms	\$799-	\$489.
POWERDrive 30 40ms	\$699-	\$399.
Seagate 31 32ms	\$749-	\$399.
40 Megabyte		
Caché Systems 45 28ms	\$899-	\$549.
CMS Enhancements 45 32ms	\$935-	\$589.



Quantum Hard Disk Drives

Industry leading Quantum quality, dependability and fast access speeds at affordable prices. Backed by our Two Year Warranty, all Quantum drives come complete with cables and software.

POWERDrive 45 40ms	\$799-	\$449.
Quantum 40 19ms (2 Year Warranty!)	\$999-	\$519.
Seagate 46 32ms	\$899-	\$449.

60 Megabyte		
Caché Systems 60 28ms	\$999-	\$579.
CMS Enhancements 60 40ms	\$1,025-	\$635.
POWERDrive 60 28ms	\$699-	\$539.
Seagate 62 28ms	\$999-	\$549.

80 Megabyte		
Caché Systems 80 28ms	\$1,199-	\$679.
CMS Enhancement 81 28ms	\$1,299-	\$779.
POWERDrive 80 28ms	\$1,099-	\$588.
Quantum 80 19ms (2 Year Warranty!)	\$1,399-	\$769.
Seagate 81 28ms	\$1,199-	\$589.

100-200 Megabyte		
Caché Systems 150 16ms	\$2,499-	\$1,299.
Caché Systems 150/150		
Tape 16ms	\$3,299-	\$2,159.
Imprimis-MacWren 170 16ms	\$2,599-	\$1,499.
Quantum 105 19ms (2 Year Warranty!)	\$1,999-	\$819.
Quantum 120 15ms (2 Year Warranty!)	\$2,499-	\$1,099.
Quantum 170 15ms (2 Year Warranty!)	\$2,999-	\$1,249.

300-600 Megabyte

CMS Enhancements PD 300 16ms	\$4,295-	\$2,395.
CMS Enhancements PD 600 16ms	\$5,845-	\$3,485.
Imprimis - MacWren 300 16ms	\$4,295-	\$1,999.
Imprimis - MacWren Runner 320 10.7ms	\$4,895-	\$2,399.
Imprimis - MacWren 600 16ms	\$5,699-	\$2,799.

SE, SE30 & IICx, IICi Internals

20 Megabyte		
Seagate 20 32ms	\$599-	\$299.

30 Megabyte		
Caché Systems 30 28ms	\$649-	\$375.
CMS Enhancements Pro 30 38ms	\$649-	\$399.
Seagate 31 32ms	\$649-	\$349.

40 Megabyte		
Caché Systems 45 28ms	\$815-	\$449.
CMS Enhancements Pro 45 32ms	\$825-	\$469.
Quantum 40 19ms (2 Year Warranty!)	\$899-	\$399.
Seagate 46 32ms	\$799-	\$399.

60 Megabyte		
Seagate 62 28ms	\$999-	\$499.



Imprimis MacWren

Renowned Imprimis quality for large storage needs. These drives feature access times as fast as 10.7ms in sizes ranging from 300 - 600 Megabytes. All drives come complete with appropriate brackets, cabling and as well as system and formatting software. One year warranty.

80 Megabyte		
Quantum 80 19ms (2 Year Warranty!)	\$1,299-	\$649.

100-170 Megabyte		
Quantum 105 19ms (2 Year Warranty!)	\$1,899-	\$699.
Quantum 120 15ms (2 Year Warranty!)	\$2,399-	\$999.
Quantum 170 15ms (2 Year Warranty!)	\$2,899-	\$1,149.

30 DAY MONEY BACK GUARANTEE

ON ALL IMPRIMIS, QUANTUM, AND SEAGATE HARD DISK DRIVES

No questions asked. If you are unsatisfied with any of these drives for any reason you may return them within 30 days of your invoice for a full refund less shipping and handling.

Visa, MasterCard, and American Express accepted NO surcharge. Your Credit Card will not be charged until your order is shipped. We accept COD orders, additional \$5.00 charge. AZ residents add 6.5%. All shipments made by Federal Express

Standard Air which is 1 to 2 day service. COD's Shipped by UPS 2 day air. Call for shipping costs. Products purchased in error are subject to a 20% restocking fee. All prices subject to change without notice. All products subject to availability.



CMS Hard Disk Drives

Hard disk drives, tape back ups, removable hard drives, high capacity drives, CMS has them all and we carry their full line.

Mac II & IIX Internals

20 Megabyte		
Seagate 20 32ms	\$599-	\$299.

30 Megabyte		
Seagate 31 32ms	\$649-	\$349.

40 Megabyte		
Caché Systems 45 28ms	\$599-	\$449.
CMS Enhancements Pro 45 32ms	\$569-	\$469.
Quantum 40 19ms (2 Year Warranty!)	\$899-	\$399.
Seagate 46 32ms	\$799-	\$399.

60 Megabyte		
Caché Systems 60 28ms	\$639-	\$499.
CMS Enhancements Pro 60 40ms	\$649-	\$579.
Seagate 62 28ms	\$649-	\$475.

80 Megabyte		
Caché Systems 80 28ms	\$729-	\$575.
CMS Enhancements Pro 80 28ms	\$749-	\$669.
Quantum 80 19ms (2 Year Warranty!)	\$1,299-	\$649.
Seagate 81 28ms	\$749-	\$499.

100-170 Megabyte		
Caché Systems 150 16ms	\$1,429-	\$1,199.
CMS Enhancements PI 170 16ms	\$1,699-	\$1,499.
Imprimis-MacWren 170 16ms	\$2,499-	\$1,399.
Quantum 105 19ms (2 Year Warranty!)	\$1,899-	\$699.
Quantum 120 15ms (2 Year Warranty!)	\$2,399-	\$999.
Quantum 170 15ms (2 Year Warranty!)	\$2,899-	\$1,149.

300-600 Megabyte		
CMS Enhancements PI 300 16ms	\$4,395-	\$2,195.
Imprimis - MacWren 300 16ms	\$4,395-	\$1,849.
Imprimis - MacWren Runner 320 10.7ms	\$4,695-	\$2,249.
Imprimis - MacWren 600 16ms	\$5,995-	\$2,699.
CMS Enhancements PI 600 16ms	\$5,995-	\$3,499.

The Reasons You Should Buy From MacLand...

1. Price— Because of our multi-million dollar buying power, we purchase large volumes of quality hardware at low prices and pass the savings on to our customers.

2. Delivery— We offer **Same Day Shipping** on all in stock items if we receive your order by 3 pm Mountain Standard Time. ALL credit card orders are shipped by **FEDERAL EXPRESS STANDARD AIR** service which means you get your merchandise fast!



**Inspected & Tested
by MacLand Technician**

No. 6

3. Technical Support— MacLand has the best technical support, period. We provide you with technical support **BEFORE AND AFTER** your purchase. Best of all, to assure you the high est quality, our trained technicians test ALL hard disk drives for quality and viruses before we ship them to you.



Ricoh Laser 6000/PS

The 6000/PS provides all of the power and performance that you'll ever need to get the job done. This Adobe Postscript Laser Printer can do letter, legal, envelopes, transparencies, and European paper sizes. Backed with a solid One Year Warranty. An unbelievable price of \$2,495. this month!

Kodak		
Diconix Portable Printer	\$899:	\$514.
Ricoh		
Ricoh PostScript Laser Printer	\$3,495:	\$2,495.
Qume		
Crystal Print Publisher	\$4,495:	\$2,849.

Erasable Optical

Peripheral Land 635 Optical 45ms	\$5,699:	\$3,995.
-------------------------------------	----------	-----------------

Memory Upgrades

One Meg SIMMS	Call.
Mac Portable Memory Now Available.	

Scanners

Abaton 300/S W/Interface	\$1,899:	\$1,299.
Abaton 300/GS W/Interface	\$2,199:	\$1,475.
Hewlett Packard ScanJet		
W/Interface	\$2,199:	\$1,499.
Microtek MS II Sheet Feed	\$1,495:	\$1,049.
Microtek MSF 300GS	\$2,195:	\$1,479.
Microtek MSF 300Z - Color		
W/Interface	\$2,695:	\$1,975.

Monitors

Magnavox 14" Color Display	\$695:	\$489.
NEC MacSync 14"		
Color Monitor	\$899:	\$519.
Qume		
Qume 14" Color Monitor	\$649:	\$499.
Qume Portrait Monitor SE,		
II, IIcx, IICI	\$1,149:	\$799.

radius™

Full Page Display	Call.
Two Page Display 19"	Call.
Two Page Display 21"	Call.
Two Page GrayScale	Call.
Two Page Color	Call.

RasterOps		
RasterOps ClearVue Mac II	\$1,995:	\$1,299.
RasterOps 19" ClearVue SE	\$1,995:	\$1,399.
RasterOps 19" ClearVue/		
GS Gray Scale	\$2,195:	\$1,599.
RasterOps 16" 108 +		
Color System	\$4,190:	\$2,949.
RasterOps 19" 108 +		
Color System	\$5,690:	\$3,699.



SIMMS

MacLand has memory in stock! Call us for our current prices. Remember, if you bought your memory from someone else, you probably paid too much!

RasterOps 16" 108 + SE30		
Color System	\$4,890:	\$2,999.
RasterOps 19" 108 + SE30		
Color System	\$5,790:	\$3,799.
RasterOps 16" 224		
Color System	\$6,990:	\$4,849.
RasterOps 19" 224		
Color System	\$8,190:	\$5,599.
RasterOps 264 Color Board, II	\$995:	\$699.
RasterOps 264 Color Board,		
SE	\$1,295:	\$899.
RasterOps FrameGrabber	\$1,995:	\$1,299.

Samsung 15" Full Page Monitor		
and Card	\$999:	\$589.
Sony 1302 Color Monitor	\$995:	\$659.
Sony 1304 Color Monitor	\$1,099:	\$719.

Accelerator Boards

radius™

Radius 16 for MacPlus or Mac SE	Call.
Radius 25 for Mac SE	Call.
Siclone Si3033 33Mhz for Mac II, IIx, IIcx	\$3,995. \$2,799.
Siclone Si3033 33Mhz with 68882 for Mac II, IIx, IIcx	\$4,995. \$3,499.

Modems/FAX Modems

Abaton Fax Modem 4800 Baud	\$395:	\$259.
Abaton Fax Modem 9600 Baud	\$595:	\$399.
Hayes 2400 External	\$499:	\$379.
Hayes 2400 Internal	\$499:	\$379.
Hayes 9600 V.42 External	\$999:	\$755.
Hayes Interbridge	\$799:	\$635.
Orchid Fax Modem 9600 Baud	\$899:	\$439.
Telebit T-1000 9600 Baud	\$745:	\$679.
Telebit T-2500 19,200 Baud	\$1,495:	\$1,229.

External Floppy Drives

Kennet Technology		
Rapport	\$295:	\$215.
Drive 2.4	\$495:	\$349.

Removables/Tape Back-Ups

**Reg.
Price** **Sale
Price**

44 Megabyte Removables

CMS Enhancements 44 25ms	\$1,495:	\$839.
Peripheral Land 44 25ms	\$1,395:	\$999.
POWERDrive 44 25ms	\$1,395:	\$749.
SyQuest 44 25ms	\$1,599:	\$749.

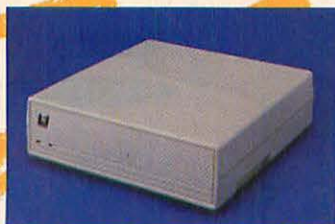
40-150 Megabyte Tape Back-Ups

Caché 150 Tape	\$1,399:	\$789.
CMS Enhancements 60	\$995:	\$649.
CMS Enhancements 150	\$1,445:	\$849.
Irwin 40 Meg Tape	\$1,395:	\$949.
Irwin 80 Meg Tape	\$1,695:	\$1,149.

Printers

Hewlett Packard

DeskWriter	\$1,299:	\$849.
------------	----------	---------------



Seagate Hard Disk Drives

MacLand now carries Seagate hard disk drives. Seagate is the world's largest manufacturer of small hard disk memory products, and MacLand carries their full line. Don't take chances with your hard disk drive. Make sure to ask for Seagate.

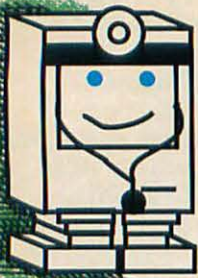
For Ordering and Technical Support Call 1-800-333-3353 (FAX #602-345-2217)



5006 South Ash Avenue, Suite 101 Tempe AZ 85282 (602) 820-5802



Circle 264 on reader service card



DR MAC TAKES

**THE LOWEST
PRICES!**

**SAME DAY SHIPPING
TILL 9:00 PM EST!**

SOFTWARE

A LASTING IMPRESSION

ResumExpert	34
AATRIX	
Checkwriter II	35
Payroll Plus	165
TimeCard	115
TimeMinder	169

ACIUS

4th Dimension	465
---------------	-----

ADOBE SYSTEMS

Adobe Illustrator '88 (incl. ATM)	275
Adobe Type Manager	55
StreamLine	225
True Form	225
Photoshop	568
Fonts	Please Call

AEC MANAGEMENT SYSTEM

AEC Info Manager	409
Fast Track Schedule	113

ALDUS

Pagemaker	382
Freehand 2.0	325
Persuasion	319

ALPHAGRAPHICS

Template Software - Pagemaker	
QuarkXpress, Style, Ready Set Go	25
Claris Smart Forms	29

ALSOFT

DiskExpress II	54
Master Juggler	54

ASD SOFTWARE

Fileguard	88
Fileguard Extended Ed	120
Fileguard Ext. Ed. 10 Pack	559

BLUTH SOFTWARE

Omnis 5	368
---------	-----

BRODERBUND

TypeStyle	119
Drawing Table	77

CAERE

Omnipage	539
----------	-----

CE SOFTWARE

Quickmail 5 User	169
QuickKeys	64
In/Out 5 User	126
DiskTop 4.0	64

CENTRON SOFTWARE

Casino Master	38
Casino Master Color	45

CHANG LABS

C.A.T.	219
Rags to Riches 3-Pack	229

COMPUTER ASSOCIATES

Bedford's Simply Accounting	199
-----------------------------	-----

DATA VIZ

MacLink Plus PC	121
-----------------	-----

DIGITAL ETC.

Business Sense	249
----------------	-----

DIGITAL K

Smalltalk/V Mac	119
-----------------	-----

DREAMMAKER SOFTWARE

Cliptures Vol 1 or 2	69
MacGallery	26

ELECTRONIC ARTS

Studio B	279
Studio 1	89
Disk Tools Plus	30
Thunder II	52

EMERALD CITY SOFTWARE

SmartArt 1, 2 or 3	82
LaserTalk	159
Type Align	57

FIFTH GENERATION

FastBack II	108
Suitcase	44

FOX SOFTWARE

FoxBASE +/- Mac 2.0	289
FoxBASE +/- Mac Multiuser	395

GRAPHISOFT

Minicad+ 2.0	499
Blueprint	343

GENERIC

1st CAD Level 1	83
-----------------	----

HAYES

Smartcom II	85
Smartmodem 9600 V	975
2400 with Smartcom II	398

MATHSOFT

Mathcad Mac	335
-------------	-----

MICROSOFT

Word 4.0	243
Excel	247
Help for Excel with Excel purchase	25
Power Point	247

MICROSPOT

MacInteriors	179
--------------	-----

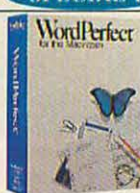
MONOGRAM

Dollars & Sense	79
-----------------	----

NEW HORIZONS

Wordmaker	67
-----------	----

SPECIAL R



WORDPERFECT \$208
WordPerfect combines word processing features like parallel columns, macros and mail merge with network compatibility. Use WordPerfect with DOS, VAX, DG and UNIX

SPECIAL R



HYPERGLOT.KANJIMASTER \$89
Hyperglot is the leader in Mac foreign language software in Spanish, German, Japanese, Italian & Russian. Digitized voices of native speakers enhance your ability to learn languages.

SPECIAL R



QUARKXPRESS \$455
QuarkXpress is the top-of-the-line professional publishing software that combines word processing and graphics handling with sophisticated page design, layout and color tools.

ODESTA CORPORATION

Double Helix Version	335
GeoQuery	189
Data Desk Professional	279

PARACOMP

Swivel 3D	289
Model Shop	369

PORTFOLIO SYSTEMS

Dynodex	86
---------	----

POWER UP

Address Book Plus	51
Address Book Plus with Binder	75
Calendar Creator	35
Fast Forms	86

PRO PLUS

Wall Street Investor	420
Accounting	599

QUARK

XPress	455
Style	166

SILICON BEACH SOFTWARE

Super Paint 2.0	124
Digital Darkroom	249
Supercard	124

SOFTVIEW

MacInTax	63
MacInTax CA, CT, NY, NJ, MA	56
TaxView Pro Planner	208
TaxView 1065, 1120, 1120S	279

SOLUTIONS INTERNATIONAL

Smartscrap	46
SuperGlue II	59
The Curator	69

SOFTWARE VENTURES

Microphone II	209
---------------	-----

SPRINGBOARD

Publisher II	86
Certificate Maker	29
Hidden Agenda	42
Sargon IV	28

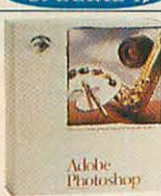
STUDIOTRONICS

Colorset	245
----------	-----

SUPERMAC

Pixel Paint Professional	395
Superspool	59
Superlaser Spool	88

SPECIAL R



ADOBE PHOTOSHOP \$568
Adobe Photoshop is the extraordinary new color tool that allows you to design with photographs, illustrations and text all in one power program.

SPECIAL R



THE UNMOUSE \$183
SuperMouse, Power Keyboard and graphics tablet—all in one! The touch tablet does everything a mouse can only faster. Simply touch to locate the cursor; press to click and program 60 macros or use the stylus to draw.

Fax Your Corporate, Educational & International Orders Now!
30 Day Approved Credit

CARE OF YOU!

1-800-825-6227
For USA & Canada

FAX 1-818-501-3760

**AFTER SALES
SUPPORT!**

**MONEY BACK
GUARANTEE!**

HARDWARE

APPLE	
MAC IICX.....	Call
MAC II CI.....	Call
MAC II XI.....	Call
Portable.....	Call
AAPS CORPORATION	
Micro TV.....	269
ALTRA	
Felix the Mouse.....	117
ABATON	
Interfax Fax-modem 12/48.....	262
Interfax Fax-modem 24/96.....	393
Quick Step Printer.....	2698
256 Grey Scale Scanner.....	1396
AOX	
DoubleTime-16.....	225
BEST DATA	
Smart One 2400.....	143
CUTTING EDGE	
30 Meg Hard Drive.....	488
45 Meg Hard Drive.....	539
45 Meg Removable.....	875
800K Floppy Drive.....	145
Monitor 19" Monochrome.....	945
ADB Keybd, inc. Quickeys.....	124
DATADESK	
Mac - 101 Keyboard.....	133
DAYNA COMMUNICATIONS	
3.5" Drive 1.44 M.....	695
DaynaTalk Mac.....	139
DaynaMail Mac.....	177
Dual Drive 1.44, 360KB.....	788
Dos Mounter.....	65
E MACHINES	
Big Picture Z21for SE.....	1775
Big Picture Z21for Mac II.....	1849
Colorpage 15 inch monitor.....	1558
FARALLON COMPUTING	
MacRecorder.....	162
PhoneNET PLUS.....	33
PhoneNET PLUS (10 Pack).....	219
PhoneNET Star Controller.....	815
Timbuktu.....	93
Timbuktu Remote.....	126
HEWLETT PACKARD	
Desk Writer.....	828
ScanJet Plus.....	1688
Paint Jet.....	1140
Paint Jet XL.....	1995
Laser Jet.....	Call
IOMEGA	
Benoulli II Single 44 Meg.....	1385
Benoulli II Dual 44 Meg.....	2085

KENNECT TECHNOLOGY

Rapport.....	197
Drive 2.4.....	325
KODAK	
Diconix M150 Portable Printer.....	535

KENSINGTON

Turbo Mouse.....	107
System Saver.....	64
Mac II Stand & Cables.....	62
Masterpiece Mac II.....	101

KEYTRONICS

Keyboard, inc. Tempo II.....	118
------------------------------	-----

KINETICS

Ether Port II.....	517
Fast Path 4.....	2084

MEGA GRAPHICS

19" Rival Mono SE/II.....	1175
19" 256 Greyscale.....	2298
19" Sony Color II, IICx.....	3999
19" Sony Color II, IICx 24 bit.....	5995

MICROTEK

Flatbed MSF-300GS.....	1475
Flatbed MSF-400GS.....	2775
Color Scanner MSF-300Z.....	1965

MICROTECH

40 Meg Quantum Drive.....	649
80 Meg Quantum Drive.....	1019
100 Meg Quantum Drive.....	Call
Removable Hard Drive.....	Call

MICROTOUCH

UnMouse.....	183
--------------	-----

MOUSE SYSTEM

A+Mouse.....	61
A+ADB Mouse.....	79

RADIUS

15" Full Page.....	695
19" Two Page Display.....	969
Accelerator Card 25 MHz.....	1089
Accel Card 25 MHz, inc Co-Pro.....	1478

RASTEROPS

ColorBoard 264.....	693
ColorBoard 108+.....	864
ClearView/SE System 19".....	1375
ClearView/II System 19".....	1275
ProColor 708+ System 19".....	3989
ProColor 724 System 19".....	6139
FrameGrabber 324 NC.....	1288
SFX Video Option NTSC.....	1095

RICOH

6000/PS PostScript Laser Printer.....	2398
---------------------------------------	------

SPECIAL R



ALPHAGRAPHICS TEMPLATES.....from \$25
Printshops of the future templates are available. Take advantage of this great timing software for use with Ready Set Go, Pagemaker, QuarkXpress, Style and Claris SmartForms.

SPECIAL R



FELIX THE MOUSE.....\$117
Finally a better mouse. Felix is only 6" by 6", with a handle that moves only one inch. Simply hold the handle like a pen & move across a 21" screen without running out of mousepad!

POLICIES

- Visa, Mastercard & AMEX accepted.
- Credit card is not charged until order is shipped.
- California residents add 6.75% sales tax
- Hours: Mon - Fri, 10-11 EST.
Sat Noon - 5 EST.
- Call (818) 501-6581. FAX (818) 501-3760.
- All prices & policies subject to change without notice.

Shipping

- \$3. UPS Standard Air/Blue. Hardware over 10 lbs will be shipped ground.
- Same day shipping on orders placed by 9:00 pm EST, if items are on hand.

Returns

- Defective software will be replaced immediately by the same item. Call (818) 501-0861 for R.A. number before return.

Money Back Guarantee

- Most products have a 30-day money back guarantee. Please inquire when you order.

SPECIAL R



AUTOSAVE II.....\$24
Autosave II from Magic Software automatically saves the file you are working on. The save interval can be set from one to 99 minutes. Never lose your data again!

SPECIAL R



DATADESK MAC-101.....\$133
Increase your speed with the Mac-101 Keyboard. This award winning keyboard includes Master Strokes enhancement software. Assign any amount of keystrokes to one function key.

NEC

MacSync.....	548
Intersect External CD Rom.....	699
Clip Art 3D for CD Rom.....	266
Color Thermal Printer.....	7188

NEMONIX

68020 16Mhz SE Accelerator.....	378
Co-Processor.....	182

ORCHID TECHNOLOGY

MacSprint II.....	209
MacFax/Modem 9600 Baud.....	435

PLI (PERIPHERAL LAND)

Infinity 40 Removable Hard Drive.....	969
TurboFloppy 1.4.....	329
Optical Drive 635 Mb.....	3795
Turbo 50 Hard Drive.....	615
Turbo 200 Hard Drive.....	1459

POLOROID

Data Recovery Disks.....	15
--------------------------	----

PRACTICAL SOLUTIONS

Cordless Mouse.....	92
---------------------	----

QUME

Crystal Print Publisher.....	2845
ScripTen.....	2698

SHARP

JX-450 Color Scanner.....	5195
JX-300 Color Scanner.....	3168
Interface for Scanners.....	469

SIMMS

1 Meg.Simms 100, 80,70 ns.....	Call
--------------------------------	------

SHIVA

EtherGate.....	1725
NetSerial.....	272
NetBridge.....	333
TeleBridge.....	333
Netmodem v2400.....	432

SUPERMAC

ColorCard/24 for Mac II.....	759
19" Sony Trinitron Color Display.....	3195

SUPRA

2400 Baud External Modem.....	109
-------------------------------	-----

SYSTEMGATE

Floppy Drive 800K.....	145
Teac Tape Drive 155Mb.....	849

THE COMPLETE SCANNERS

Half-Page Scanner/400.....	310
Complete Page Scanner.....	745

THUNDERWARE

ThunderScan 5.0.....	178
Lightning Scan.....	368

TOSHIBA

CD Rom.....	875
-------------	-----

DR. MAC, INC.

14542 Ventura Blvd., Suite 200
Sherman Oaks, CA 91403

1-800-825-6227

SPECIAL R



AATRIX CHECKWRITER II.....\$35
Balance your books before tax season! This easy to understand program not only keeps your finances under control but also reminds you when your payments are due. Eddy Honorable Mention.

INTENSIVE CARE



Mac IICx + 4 meg RAM + 80 meg internal.....\$4499

SIMMS 70 nanoseconds.....\$75

Circle 368 on reader service card

- **FREE SHIPPING** on all products*
- **GUARANTEED LOWEST PRICES** on all in-stock items
- Great **TOLL-FREE** customer support
- **QUALIFIED** personnel will help you find the right products
- We welcome **EDUCATIONAL, CORPORATE and AEROSPACE** purchase orders
- Ask about our **PACKAGE DEALS**

[illegible]

COVER LASERWRITER II	22	SOMMER	17
COVER MAC SEGE	16	STAFFER	17
COVER MAC OS X KB	15	SPENDING COACH	17
COVER MICRO	9	STAFF SWELL MEDICAL	17
COVER STANFORD KB	9	STATIONER	21
COVERS	9	STATIONER'S GRAPHICS	21
DATABASE PROFESSIONAL	269	SUPER DRYER	21
DESKTOP BATTERY CHARGER	9	TAX VIEW	9
DESKTOP CASE 4	9	TEXTURY	9
DESKTOP CASE 4 MAX	9	THANK U	9
FLOPPY DISC WALLET	13	THANKS 4	9
ELAPAGE ANTIKRA	65	TIPS	13
LASERWRITER II TINY TRAY	50	TOUCH	13
LASERWRITER II COVER	50	TRAMPZ	13
LE 4 COLOR FIBERON	18	VERSATECH PRO	18
LE BLACK RUBBER	15	WALL BAKER	18
MAC II US DUST COVER	15	WALLS	18
MAC II TSWING	25	WORD	24
MAC II TSWING DOVEN	25	WORD PERFECT	16
MAC II MACSEWRITER	10	WORDS	16
MAC II MACSEWRITER II	10	WRITE	16
MAC II PC DRIVE 2.4	375	WRITENOW	10
MAC II KB BENCH	129		
MAC II KB PLAY NUM	129		
MAC II KEYBOARD AKB	129		

MOUSE PADS	9
MOUTH POCKET	8
M.P. M61	10
PRINTER MUFFLER 80	10
PRINTER MUFFLER 132	10
PRINTER STAND	13
QUICKNET IBM/PC	22
QUICKNET IGB	22
S&S EXTENSION	17
S&S FERNERAL 3	17
S&S SYSTEM CABLE, 6	17
S&S TERMINATOR	17
TANT 35 "HOTO PACK	25
VHS CASSETTES	25
VHS CASSETTES	25
VCR SAFE STRIP	16
VCR SAFE STRIP	16
STAND, MAC II	17
SYSTEM SAVER/MAC SE	22
SYSTEM SAVING PLUS	22
TELEPHONE STAND	10
TOOL KIT 12 PIECE	22
TOPS KIT 12 PIECE	22
UPS SE. BATTI BACKUP	22

[illegible]

CREDIT CARDS ACCEPTED: We accept Visa, MasterCard, American Express and Discover. No Surcharge on Visa or MasterCard. No surcharge on Discover. 4% surcharge on American Express.

WE DON'T CHARGE YOU CUNT UNTIL THE PRODUCT SPELS!

C.O.D. ORDERS: Add \$3.00. Cash, money orders, and cashiers checks are accepted, no cash on delivery or personal checks. Shipping method is UPS Ground.

SHIPPING: Shipping and insurance within the continental United States by UPS Ground are FREE. Orders over \$200 will be shipped Federal Express. Post Day Air on request at charge. Cost for other shipping methods and insurance will be calculated and added to the order. No surcharge for Alaska, Hawaii and Puerto Rico. International APO and FPO orders packaged and shipped to USPO. Alaska and Hawaii orders - flat rate.

MAIL-IN ORDERS: Please send money order or cashier's check for full service. Personal checks expire up to 13 days in date, include name, address and telephone number. If ordering by credit card, include expiration date and billing address. Card for exact shipping rates if applicable.

CONDITIONS: Products are subject to change without notice. All items subject to availability. We reserve the right to refuse to sell to anyone.

INTERNATIONAL Toll-FREE ORDERS POLICY: Minimum order \$101 US Dollars for any phone. Absolutely no product returns, or any shipping expenses will be taken over the toll-free phone orders. For any other information, please call (813) 270-5330. Shipping prices vary and are quoted below order form. Payment in most US credit card or electronic bill transfer. For any other information, please call our regular toll free. MasterCard and International shipping available.

INTERNATIONAL PHONE NUMBERS: Canada: 1-800-548-2512, France: 19-0546-1009, Australia 0214 830-185-710.

[illegible]

04	GOLF	34	FANTASTIC PLUS 2
05	GOLF CLASSIC	35	FOOTCOURTHER
06	GOLF FID FID FID	36	FOUR'S YOURS
07	GOLF FOOTBALL	37	FORMS & SCHEDULES
08	GOLF INNOVATIVE	38	FORMS & BUSINESS
09	COMMAND	39	FORMS & PERSONAL FORM
10	COMP	40	FRESHMAN
11	CONCERN BASEBALL	41	FRUIT PLANT
12	COST & MATH	42	GRAPHS CASO LEVEL 1
13	COURT ON THE ATLANTIC	43	GRAPHING WORKBOOK
14	COURT CHALLENGE	44	GRAPHING MATH CAN
15	COURT CHALLENGE	45	GRAPHING PART 1
16	COURT CHALLENGE	46	HYPERMATH
17	COURT CHALLENGE	47	ILLUSTRATION 00
18	COURT CHALLENGE	48	JACKIE STUARD
19	COURT CHALLENGE	49	KAY CUP KNOTS
20	COURT CHALLENGE	50	KAY CUP KNOTS
21	COURT CHALLENGE	51	KAY CUP KNOTS
22	COURT CHALLENGE	52	KAY CUP KNOTS
23	COURT CHALLENGE	53	KAY CUP KNOTS
24	COURT CHALLENGE	54	KAY CUP KNOTS
25	COURT CHALLENGE	55	KAY CUP KNOTS
26	COURT CHALLENGE	56	KAY CUP KNOTS
27	COURT CHALLENGE	57	KAY CUP KNOTS
28	COURT CHALLENGE	58	KAY CUP KNOTS
29	COURT CHALLENGE	59	KAY CUP KNOTS
30	COURT CHALLENGE	60	KAY CUP KNOTS
31	COURT CHALLENGE	61	KAY CUP KNOTS
32	COURT CHALLENGE	62	KAY CUP KNOTS
33	COURT CHALLENGE	63	KAY CUP KNOTS
34	COURT CHALLENGE	64	KAY CUP KNOTS
35	COURT CHALLENGE	65	KAY CUP KNOTS
36	COURT CHALLENGE	66	KAY CUP KNOTS
37	COURT CHALLENGE	67	KAY CUP KNOTS
38	COURT CHALLENGE	68	KAY CUP KNOTS
39	COURT CHALLENGE	69	KAY CUP KNOTS
40	COURT CHALLENGE	70	KAY CUP KNOTS
41	COURT CHALLENGE	71	KAY CUP KNOTS
42	COURT CHALLENGE	72	KAY CUP KNOTS
43	COURT CHALLENGE	73	KAY CUP KNOTS
44	COURT CHALLENGE	74	KAY CUP KNOTS
45	COURT CHALLENGE	75	KAY CUP KNOTS
46	COURT CHALLENGE	76	KAY CUP KNOTS
47	COURT CHALLENGE	77	KAY CUP KNOTS
48	COURT CHALLENGE	78	KAY CUP KNOTS
49	COURT CHALLENGE	79	KAY CUP KNOTS
50	COURT CHALLENGE	80	KAY CUP KNOTS
51	COURT CHALLENGE	81	KAY CUP KNOTS
52	COURT CHALLENGE	82	KAY CUP KNOTS
53	COURT CHALLENGE	83	KAY CUP KNOTS
54	COURT CHALLENGE	84	KAY CUP KNOTS
55	COURT CHALLENGE	85	KAY CUP KNOTS
56	COURT CHALLENGE	86	KAY CUP KNOTS
57	COURT CHALLENGE	87	KAY CUP KNOTS
58	COURT CHALLENGE	88	KAY CUP KNOTS
59	COURT CHALLENGE	89	KAY CUP KNOTS
60	COURT CHALLENGE	90	KAY CUP KNOTS
61	COURT CHALLENGE	91	KAY CUP KNOTS
62	COURT CHALLENGE	92	KAY CUP KNOTS
63	COURT CHALLENGE	93	KAY CUP KNOTS
64	COURT CHALLENGE	94	KAY CUP KNOTS
65	COURT CHALLENGE	95	KAY CUP KNOTS
66	COURT CHALLENGE	96	KAY CUP KNOTS
67	COURT CHALLENGE	97	KAY CUP KNOTS
68	COURT CHALLENGE	98	KAY CUP KNOTS
69	COURT CHALLENGE	99	KAY CUP KNOTS
70	COURT CHALLENGE	100	KAY CUP KNOTS

[illegible][illegible]

1-800-222-2808
4451-B REDONDO BEACH BLVD. LAWDALE, CA 90260
MAIL ORDERS AND P.O.s PLEASE CALL FOR MOST
CURRENT PRICES

Circle 498 on reader service card

VIDEOWORKS II
VIDEOWORKS II ACCELER
VIDEOWORKS II HYPERCD
WET PAINT
WORLD CLASS FONTS 142
WORLD CLASS FONTS 384
WORLD CLASS FONTS 546

[illegible]

CMS EXTERNAL 20GB HD	425
CMS EXTERNAL 30GB HD	475
CMS LARGE CAPACITY HARD DRIVES	
CMS REMOVABLE 10MB HD	CALL
CMS 8MM TAPE BACKUP	CALL
QUANTUM KUBE EXT, 19mb	540
QUANTUM MS MS EXT, 19mb	675
QUANTUM KOMB INT, KIT AND SOFTWARE	435
QUANTUM 15MB INT, KIT AND SOFTWARE	750
MINITEX HARD DRIVES	700

E-MACHINE BIG PICTURE PLUS & SE	1,175
E-MACHINE 116 MONITOR	2,195
E-MACHINE 114 MONITOR	4,195
E-MACHINE 2-21 15" GRAPHSCALE	2,335
FASTERPCS CLEARFLAT 56 MONITOR	1,250
FASTERPCS COLORBOARD 264	875
SONY 1354 MONITOR	899
ABITON 3000S, 256 GREY, SCANNER	1,399
ABITON 300S FLATBED SCANNER	1,150
MSF 3000S, MICROTEK SCANNER	1,105
MSF 3002, COLOR GRAPH KIT	1,399
MSF 3002, MICRO INTERFACE KIT	399
MSF 4000S, MICROTEK SCANNER	2,499

[illegible]

Practical Solutions
Cordless Mouse

\$97

HARD DRIVES

Hard Drives International is proud to carry the

POWERDrive™



INTERNAL KITS FOR MAC SE, II, IIcx & IIci

POWERDrive 20/I	Seagate	40ms	\$299
POWERDrive 30/I	Seagate	40ms	\$349
POWERDrive 45/I	Seagate	40ms	\$399
POWERDrive 40/I	Quantum	19ms	\$449
POWERDrive 80/I	Quantum	19ms	\$684
POWERDrive 105/I	Quantum	19ms	\$799
POWERDrive 200/I	Conner	19ms	\$996

Comes complete with a pre-formatted, pre-tested hard drive, formatting & partitioning software, mounting hardware, cabling & How-To manual.

EXTERNAL DRIVES FOR MAC Plus, SE & II

45Mb	Seagate	40ms	\$ 499
40Mb	Quantum	19ms	\$ 549
80Mb	Quantum	19ms	\$ 799
105Mb	Quantum	19ms	\$ 899

Includes a pre-formatted, pre-tested hard drive, UniMac external case, power supply, cables, manual and formatting & partitioning software.



Hard Drives
December 1988



Top Ten Mail-Order Company
PERSONAL COMPUTING



June 27, 1989
Mass Storage Mail Order

EXTERNAL DRIVES FOR MAC Plus, SE & II

POWERDrive 20	40ms	\$349
POWERDrive 30	40ms	\$399
POWERDrive 45	40ms	\$449
POWERDrive 60	28ms	\$539
POWERDrive 80	28ms	\$588
POWERDrive 150	16ms	\$1096
POWERDrive 200	19ms	\$1144
POWERDrive 320	16ms	\$1796
POWERDrive 600	16ms	\$2796

All units are factory-tested and pre-formatted for hassle-free setup. Each steel external case comes complete with power supply, cabling, Ontrack's "Disk Manager Mac" software and a comprehensive reference manual. High Quality Seagate, Micropolis, Quantum, Imprimis, MiniScribe or Conner hard drives available. Autoparking heads - Low Power - Low Heat. No assembly required. Just POWER UP and Go!

45Mb Removable Hard Drive



Compare
with Ehman
and Mass
MicroSystems!

- Uses SyQuest™ mechanism
- Unlimited Capacity
- Super Fast - 25ms!
- Includes One cartridge

\$749

Factory-trained Technicians
are on hand to answer
your questions!



MEMBER
MMC
MICRO COMPUTER
MARKETING COUNCIL
of the Direct Marketing Association, Inc.

HARD DRIVES
International

Insight
Another
Insight
Company
Distribution Network Inc.

1912 W. Fourth Street
Tempe, AZ 85281
(602) 967-5128
FAX: (602) 829-9193
Int'l FAX: (602) 921-8312

In U.S. & Canada
(800)-765-DISC

Corporate Sales: (800) 729-3472
24 hr. Order Status: (800) 776-3472
International orders: (602) 967-7435



Never a Surcharge
for Visa & MC!

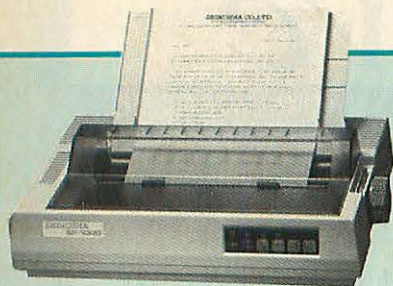
Price and availability subject to change. All items are new with manufacturer's warranty. 5% surcharge for American Express and COD orders. P.O.'s accepted from qualified buyers: 2/10, NET 20, 5% surcharge. 30-day Guarantee conditions: Shipping & handling charges not refundable; product must be in original condition. Add \$11 shipping for Military APO/FPO Express delivery. Hard Drives International is a division of Insight Distribution Network, Inc. All trademarks and trade names are the properties of their respective owners.

All products
come with a
30 Day
"Worry-Free"
Guarantee
and
Replacement
Policy

MW0490

PRINTERS & MONITORS

Dot Matrix



Seiksha

Imagewriter/Mac Compatible

EPSON Letter Quality Printers

LQ-510*\$339
 LQ-850, LQ-950, LQ-1050, LQ-2550...Call
 EPSON LQ Printer Software\$59
 (*Requires Serial Card)



Hewlett Packard
 H.P. DeskWriter

300 d.p.i.\$849

Accelerator Boards

Radius 16\$595

Hard Drives

CMS Externals

MacStack 20 .. 32ms\$398
 MacStack 30 .. 28ms\$488
 MacStack 45 .. 28ms\$548
 MacStack 60 .. 38ms\$648
 MacStack 80 .. 28ms\$748
 PD 100 .. 25ms\$898
 PD 170 .. 18ms\$1498
 44 Megabyte Removable\$848

CMS Internals

(SE, II, IIcx)
 40 Megabyte\$478
 100 Megabyte\$848
 200 Megabyte\$1498

Everex Hard Drives

External/InternalCall

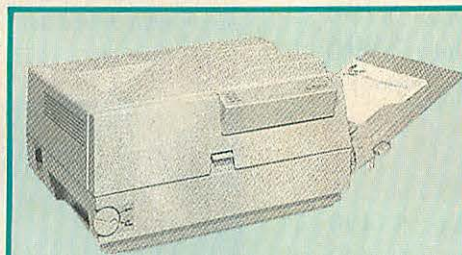
Cutting Edge 800K\$149

Tape Back-up Systems

CMS TS-60\$698
 Cache 150mg\$798

GCC Technologies

Write Move Portable Ink-Jet\$519



GCC PLP Laser\$1595

PLP Plus Laser\$1695

Call for Systems/Simms Pricing

Monitors



Magnavox 14" Color Mac Display

640 x 480 Resolution\$509
 Fine Dot Pitch, Tilt & Swivel Base

E-Machines

Big Picture Z21\$1798

Big Picture Z21 IQ\$2598

Big Picture T-16 color\$2898

Big Picture T-19 color\$4498

New ColorPage\$1698

NEC

MacSync\$528

Radius

Full Page Display\$1095

Other ModelsCall

Raster Ops

Colorboard 264/2\$729

Boards/MonitorsCall

Sigma Designs

Pageview SE 15"\$798

Silverview 21"\$1598

Silverview 21" (GS)\$2398

Datadesk Keyboard

Mac 101 or ADB version\$129

Keytronics Keyboard

MacPro\$119

Modems

Beverly Hills 2400 External\$129

Beverly Hills 2400 Internal\$399

**Computer professionals
 since 1975.**



1-800-426-8166

**Fax Machine
 (213)675-2522**

**From Beverly Hills
 (213)273-3710**

279 South Beverly Drive, Suite 1200, Beverly Hills, California 90212

SHIPPING

All items in stock will ship in 24 hours. We offer daily service from Federal Express, UPS, U.S. Postal Service. Call for handling and shipping fees. Minimum shipping charge \$4.00.

- Plain and simple. Hardware; your satisfaction guaranteed or your money back.
- Software: defective software will be replaced. Manufacturers policies prohibit us from offering refunds on opened software.
- We accept most major credit cards with no surcharge added.

- Your credit card is not charged until we ship.
- Please allow 10 days for personal and company checks to clear.
- C.O.D. orders accepted.
- We gladly accept purchase orders from most major institutions.
- International orders accepted.

- California, Texas, Georgia and Arizona residents please add the appropriate local sales tax.
- To place orders call Monday thru Friday 7AM to 6PM P.S.T..
- Prices and availability subject to change.

Circle 5 on reader service card





MacProducts USA



UPGRADES



1MB SIMM's 70/80/100 ns	call
4MB SIMM's	call
Lifetime Manufacturer's Warranty!	
Laptop SIMM's	call
256K SIMM's	\$24
Magic SCSI	\$69
128K-512K Upgrade	\$149
128K-1024K (1 MB) Upgrade	\$295
512K-1024K (1 MB) Upgrade	\$299
512K-2048K (2 MB) Upgrade	\$399
512K-4096K (4 MB) Upgrade	\$599
800K Drive and ROM's	\$299
SE/30 Upgrade	\$1399

MAGICNET

100% Flash Box, Phone Net,
Local Talk compatible 19.00

ACCELERATORS 020/030

16 mhz 68030 +, SE	\$599
25 mhz 68030 +, SE	\$999
16 mhz 68020 SE	\$499
25 mhz 68020 SE	\$895
33 mhz 68020 SE	\$1999
68881, 68882 Co-Processors	\$125/\$199
PMU - 68851	\$179
030 Available now. Call for more info.	
Run System 7.0 on 512, Mac + and SE	

MAGIC DRIVE TAPE



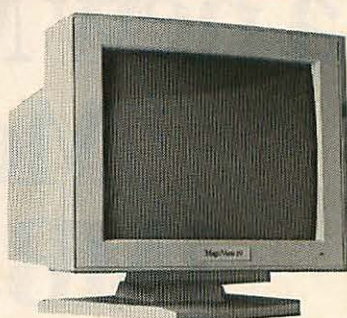
	Internal	External
20 megabyte	\$389	\$449
30 megabyte	\$399	\$549
Quantum 40	\$475	\$599
Quantum 80	\$699	\$849
Quantum 105	\$749	\$899
45 megabyte	\$475	\$599
45 mb Removable		\$799
45 mb Cartridges, ea		\$89
60 megabyte	\$549	\$649
80 megabyte	\$649	\$749
60 mb Tape Backup		\$695
150 mb Tape Backup		\$895
1.2 gig Tape Backup		\$2995
2.3 gig Tape Backup		\$3995
100 mb CDC	\$850	\$950
150 mb CDC	\$1395	\$1495
300 mb CDC	\$1995	\$2150
600 mb CDC	\$2800	\$2950
600 mb Read/Write Optical Drive		\$3395

MagicDrive 91 - "The Fastest Unit Tested" - MacUser

MAGICMODEM

100% Hayes Compatible - Auto Dial/
Auto Answer 2400/1200/300 Baud -
2-Year Warranty \$99
White Knight (Red Ryder 11.0) \$75

DISPLAY SOLUTIONS



19" B&W Monitor - 2 Page Display.
72 dpi, 78 hz. Includes card for
+, SE, SE/30, II, IIX, IICX \$999
13" & 14" 100% Apple Compatible
8 bit color card \$299
13" 8 bit color card for SE/30 \$499
19" 8 bit color card for Mac II series \$499
19" 32 bit color card Mac II series \$2995

SmartCACHE

- SCSI Disk Cache
- Tracks your history and optimizes using 64 caching algorithms
- Cuts 30-50% off the access time of any SCSI hard drive
- Write through cache for maximum data integrity

\$99

SOFTWARE

Adobe Fonts	40% off!!
Adobe ATM/ATM Plus	56/109
Big Thesaurus	59
4th Dimension	call
Freedom of the Press	265
Freehand v2	315
Illustrator '88	285
Liaison	call
Mac Link +	124
Macromind Director	448
Mathematica for Mac II	669
Microleague Baseball	call
Microphone II	219
Microsoft Products	call
Model Shop	379
OmniPage	545
PageMaker 3.1	385
Photo Mac	509
Pixel Paint Professional	395
Quark XPress 2.12	475
Quick	36
QuickKeys	64
Read It OCR	248
Resume Expert	call
Retrospect	154
SAM	59
Soft PC	244
Suitcase II	44
SUM II	95
SuperCard	call
Swivel 3D	289
TOPS Bundle 3.0	call
White Knight	75

SYSTEMS

SE/30 - 2799 - Mac II cx - 3299	
Laptop - call	
All systems and peripherals available.	
Call for best prices.	

HARDWARE

Accelerators	
Dove Marathon 020 MSE 1	429
Dove Marathon LAN 020	1009
Dove Marathon 030	969
Dove Marathon Racer	call
Orchid Mac Sprint	219
Co-Processors	
68851 PMMU	149
68881 16 MHz	125
68881 25 MHz	225
68882 16 MHz	199
68882 25 MHz	299
68882 33 MHz	495
68882 40 MHz	595
Digitizers	
Kurta IS/ADB Tablet 8.5x11	255
Farallon MacRecorder	159
FrameGrabber 324 nc	1999
Personal Vision	2119
Audio Media	call
Fans	
Kensington System Saver SE 51	51
Mobius Fanny Mac	57
Mobius SE Silencer	34
Mice/Keyboards	
Abaton ProPoint	87
Cutting Edge Mac105	119
Datadesk Mac 101	135
Kensington TurboMouse	109
Keytronics MacPro	119
Quickstick 512+ or ADB	39/49
A+ Optical Std or ADB	69/79
Modems	
Abaton InterFax 24/96	412
Hayes 2400	385
Orchid MacFax	446

HARDWARE

Monitors	
AppleColor 13"	call
Magnavox Color 14"	499
NEC MacSync 14"	552
Networking/Communications	
E-MAC SpeedTalk	99
Kinetics Etherport	443
Shiva NetModem 2400	399
TOPS FlashBox	123
TOPS FlashCard	155

**We carry
over 4,000
products
for the
Macintosh**

Printers	
GCC BLP and PLP	call
HP DeskWriter	call
HP DeskJet	call
HP PaintJet XL 32 bit	call
QMS ColorScript 100	call
QUME Crystal Print	3195
QUME ScriptTen	3195
Ricoh 6000PS 2	2399
Seikoshia Dot Matrix Printer 210	call
Sharp JX 730	call
Texas Instruments	call

HARDWARE

Printer Interfaces	
GDT JetLink Express	call
Orange Micro Grappler C/Mac 76	
Orange Micro Grappler LS 102	
Orange Micro Grappler LX 125	
Scanners	
Abaton 300GS	1350
Logitech Scan Man	325
Microtek 300Z w/interface	1899
Sharp JX 450 Color	5245
Sharp JX 100	716
Sharp IEEE interface	469
LightningScan	369
ThunderScan	179
Storage	
CMS SD30	459
Cutting Edge 800k	149
Kennetech Tech Drive 2.4	359
Rapport	215
NEC CD ROM w/interface	825
Video	
AAPS Micro TV	259
Computer Eyes B&W or Color	call
Video Cards	
TruCapture 324	1989
264 24 bit	699
264 SE/30 24 bit	907
Disks, Ribbons, etc	
Polaroid DS	12
Polaroid DS HD	24
MacDisk Bulk (50)	38
Sony Boxed (10)	13.50
Sony Bulk (50)	49
Black Ribbons	3
Colored Ribbons	3.50
60 meg Tapes	24
150 meg Tapes	35

ORDERING

Orders ONLY: 1-800-622-3475
Information: 1-512-343-9441
Fax: 1-512-343-6141
Tech Support: 1-512-343-9441
Singapore
Voice/Fax: 65 250 3423

Hours: 7am - 10pm, M-F,
10am - 6pm S-S CST
Tech Support Hours:
9am - 5pm, M-F CST
Minimum Order: \$40.00



Payment: Visa, MasterCard, American Express, Optima (no surcharge), company & personal checks, COD, and Company & Institution PO's. Net 15. No AmEx on CPU's. \$5000 maximum on COD's. **Tax:** Texas residents only, add 7 / % sales tax.

Prices and items are subject to change and availability.

Terms: You are not charged until your order is shipped. Returns may be subject to a restocking fee.

Shipping: Minimum \$4.50 -- Emery, Airborne, UPS Next Day & 2nd Day Air, US Mail.

Leasing: Available on orders over \$2500. Call for information.

"We really know your Mac."

8303 Mopac Expressway • Suite 218 • Austin, Texas 78759 • USA • 1-800-622-3475

1-800-MAC-DISK

Circle 465 on reader service card

A quality product from MacShopper

The next best thing to a new Mac is a Power User's Memory Upgrade! 1MB SIMMs Modules... *Now only \$89 each.**

Now you can unlock the awesome power in your Mac and use it to its full potential with a Power User's Memory Upgrade from MacShopper. By replacing the existing 256K memory chips with our powerful 1MB memory modules you can bring more brain power to your Mac than you thought possible.

Right now our price for these high quality SIMMs (Single Inline Memory Modules) is lower than ever. And a memory upgrade is easy to install yourself, in not much more than half an hour.

WHY MORE MEMORY?

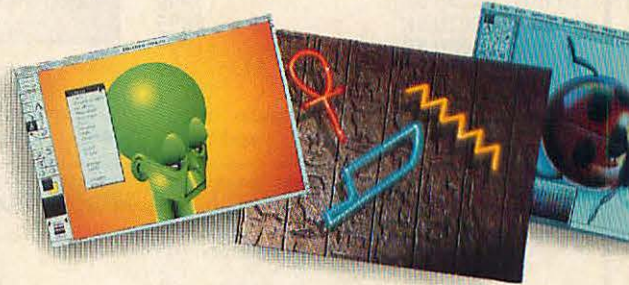
Have you noticed that some of the latest software requires too much memory to run on your Mac? Would you like to run MultiFinder plus two or more programs—all at the same time? Are you tired of having to quit your word processor just to answer a question from a spreadsheet?

Well, added memory is a must! Join the thousands of Mac users who are taking advantage of low SIMMs prices right now.

And quite apart from the ability to do multi-tasking, added memory speeds up your disk access time and eliminates delay when selecting menu items.

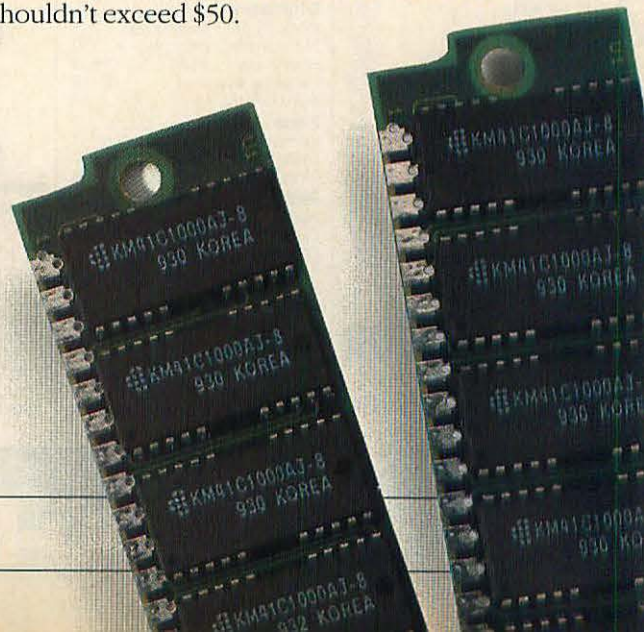
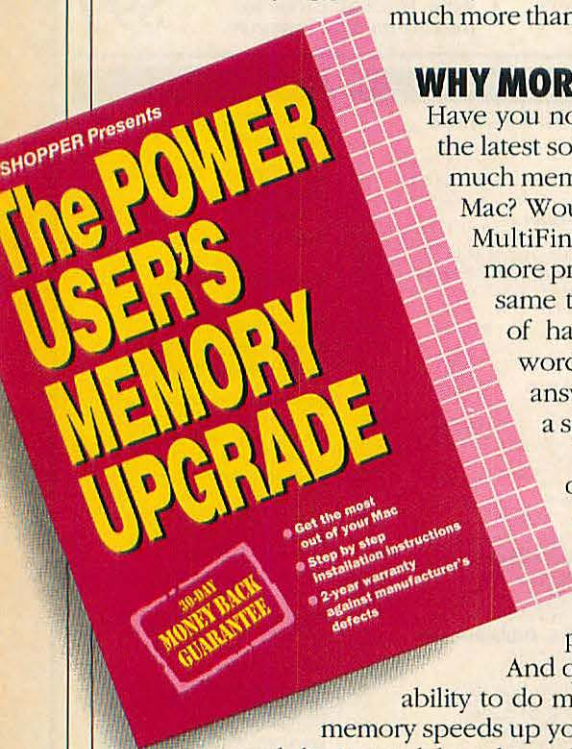
WHAT DO I NEED?

It couldn't be simpler. Call and we'll help you select the right Power User's Memory Upgrade for **your** Mac. We'll rush it to you overnight for just \$7 extra. You'll find installation at home is easy when you use our "step-by-



step" instruction manual. The whole job should be complete in less than one hour. You'll need a simple tool kit which is available for just \$15.

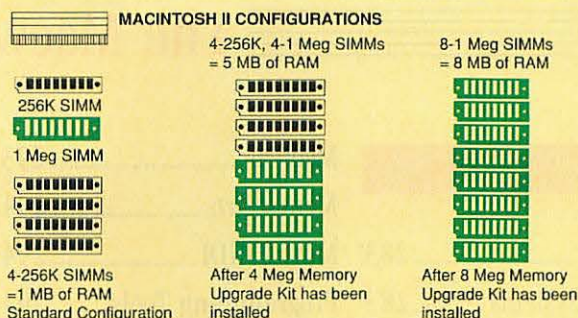
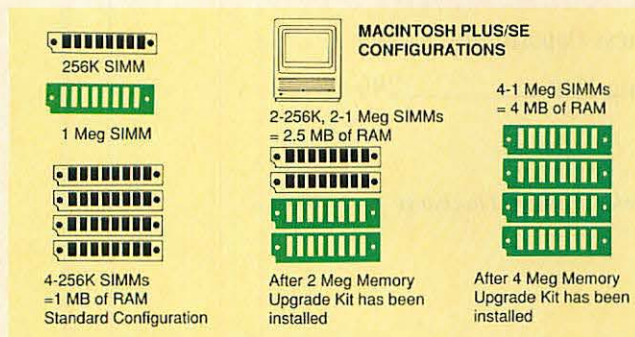
If you prefer, you can have a computer store install your SIMMs for you. Their service technicians have the necessary tools and expertise. The total cost shouldn't exceed \$50.



Circle 440 on reader service card

The Mac Plus and Mac SE have four available slots on the motherboard, which originally contain four 256K SIMMs — totalling 1 megabyte (1MB) of memory. To upgrade, you can replace each 256K module with a 1MB module, but you must do this in pairs.

Replace two 256K modules and you will have a total of 2.5MB of memory. (That's the two new 1MB modules plus the original two 256K modules.) Replace all four modules and you'll have 4MB. (You should save the 256K modules for later use if you want to pass your Mac on to someone else.)



The Mac II, IIfx, IIfx and SE/30 each come with a total of eight slots. The standard configuration has four 256K SIMMs modules, or a total of 1MB. Here, memory must be upgraded in multiples of four. This allows for expansion from 1MB to 4MB, 5MB or 8MB.

Remove the four 256K modules and replace with 1MB modules and you have 4MB. Leave the original modules and add four 1MB modules and you get 5MB. Removing the original modules and adding eight new 1 MB modules will bring you to 8MB of memory.

FAST, FASTER, FASTEST

SIMMs come in different speeds and are calibrated in nanoseconds (ns) from 70 to 120ns. Anything faster than 120ns doesn't much help any Mac but the IIfx.

The system doesn't respond any faster anyway. But you can always take your memory chips with you when you move on to a new Mac, so there may be an advantage to speed at a later date.

QUALITY CONTROL

MacShopper buyers and agents scour the world in search of top quality components for our SIMMs modules. They're supplied only by top grade manufacturers

like Samsung, Siemens, Texas Instruments, Fujitsu, Intel, etc. Each unit is tested for performance, quality and noise, in temperatures from freezing to 158°F.

Install a Power User's Memory Upgrade and working with your Mac will never be the same again! Call MacShopper now and we'll help select the right memory upgrade. We'll ship UPS Ground, free, or overnight for just \$7.

1MB 120ns \$89 each	1MB 80ns \$109 each
1MB 100ns \$99 each	1MB 70ns \$119 each

MacSHOPPER
1-800-622-7006

Call TOLL-FREE 24 hours a day, seven days a week.

(In Canada, call 1-800-243-5622)

MSWD0

©1990 Micro Warehouse Inc.
MacShopper is a division of
Micro Warehouse Inc.

30 DAY MONEY BACK GUARANTEE

Try a Power User's Memory Upgrade for 30 days at no risk. If, for any reason, you're not delighted, just call us for a return authorization number and return the products with the original packaging and documentation for a full refund. Power User's Memory Upgrades are guaranteed for two years against manufacturer's defects.

*Check the chart for the number of modules you may need. Price and item availability are subject to change without notice.





The Macworld Catalog

Hardware

Bar Code	283	Medical	293
Computer Systems	283	Mental Arts	294
Data Acquisition	285	Music/MIDI	294
Emulators	285	Programming Tools	294
Memory Upgrade	285	Public Domain	294
Peripherals	288	Real Estate	295
Printers	288	Reference	295
Scanners	288	Religion	295

Software

Bar Code	289	Spreadsheets	296
Business	289	Statistics	296
CAD/CAM	289	Training	296
Clip Art	289		
Communications	289		
Desktop Publishing	290		
Educational	290		
Engineering	290		
Entertainment	291		
Fonts	292		
Genealogy	292		
Health	293		
Hypercard Stacks	289		
Languages	293		
Lottery	293		

Miscellaneous

Business Opportunity	299
Mailing Lists	299

Categories are subject to change

Services

Computer Insurance	296
Data Conversion	296
Desktop Publishing	297
Laser Recharge	297
Training	297

Accessories

Mouse Pads	298
Supplies	298

The Macworld Catalog Advertising Rates & Information

The Macworld Catalog section is a monthly link-up for advertisers and volume purchasers of Macintosh-related products and services. The Catalog offers advertisers a low-cost marketing opportunity and provides readers with a timely, easy-to-use menu for product buying.

Display ads are sold by column inches (2" minimum). Standard red is available as a second color. Text-only listings are available for a minimum of three issues at \$450 per issue.

For more information on *The Macworld Catalog*, call 800/888-8622.

The Macworld Catalog Advertising Sales Staff

Beverly Schneider, Telemarketing Sales Manager
Niki Stranz, Western Account Manager, 415/978-3105
Carol Felde, Eastern Account Manager, 415/978-3152

501 Second Street
San Francisco, California 94107
800/888-8622

For your ad to appear on *The Macworld Catalog* screen, call 800/888-8622.

The Macworld Catalog



Hardware Bar Code

BAR CODE & MAGNETIC STRIPE READERS FOR MACINTOSH PLUS, SE & II

Connects on keyboard or ADB
Requires no additional program or port
Does not affect keyboard or mouse
Industrial quality, heavy-duty units
Also available

SmartCard encoder/reader
Magnetic encoder
Code 39 UPC & Printing Software
Portable Bar Code Reader

TPS Electronics
4047 Transport Street
Palo Alto, CA 94303
415-856-6833 800-526-5920
Telex: (Graphnet) 371 9097
FAX: 415-856-3843

CIRCLE 666 ON READER SERVICE CARD

EZBarcode®



Bar Code Reader for Macintosh Plus, SE, II PC-WEDGE II \$309

- Works with any program — no software required
- Connects to keyboard or computer • Recognizes bar code type automatically • Reads all standard bar code types • Supports full ASCII, check digits, add-ons, preambles, postambles, macros, and more
- Automatic setup from bar code menu • 5 year warranty



TimeKeeping Systems, Inc.
1306-W East 55th Street • Cleveland, OH 44103
Phone: (216) 361-9995 • Fax: (216) 361-0030

CIRCLE 695 ON READER SERVICE CARD

Computer Systems

BAR CODE READERS

For All Macintosh Models

- No software changes
- Attaches as 2nd keyboard or through ADB
- Installs in seconds
- Reads UPC/EAN, Int 2 of 5, Codabar, Code 128, MSI, and Code 39
- Outstanding read rate

Complete with Steel Wand—\$399
Complete with Laser—\$989
Magstripe Option—add \$100
64K Portable Reader—\$899

1 YEAR WARRANTY
30 DAY \$\$ BACK GUARANTEE
CA 408-458-9938 800-345-4220

417 Ingalls Street
Santa Cruz, CA 95060

WORTHINGTON
DATA SOLUTIONS

CIRCLE 555 ON READER SERVICE CARD

Call The Macworld Catalog
and see why.



800.888.8622

Build Your Own Mac

from catalog parts & save \$\$\$ over new or used systems. Save \$\$\$ on upgrades to your own Mac too!
Assemble your CAT Mac from readily available new/used catalog parts with little or no soldering req'd. Have fun, gain experience, break no laws. Read "Build Your Own Macintosh" & learn secrets. Illustrations/photos show how. Makes a great gift. \$24.95 postpd. Visa/MC, check.

Brant Associates
4420 SE Mark Kelly Ct.
P.O. Box 68708
Portland, OR 97268

Extraterrestrial Prices

Beat all prices unless temporarily sold out! Call for updated prices. COD

MacPlus	\$1100
SE2	\$1929
SE2/32mb, SE/30-4/80mb \$low	
IIcx	\$3319
IIcx 2/45mb	\$3729
IIcx 4/105mb	\$4625
LaserwriterIINT	\$3438
IINTx \$4889 w/cable toner	
MacPlus 20mb \$395, More...	
<i>Jupiter Computers</i>	
6224 Knox Ave.	
Fontana, CA 92336	
714/829-2953	

Here's The Difference WE BUY MACS

The Maya Guarantee

Satisfaction is guaranteed. Maya Computer offers a one year parts & labor warranty on both new and used Macintosh computers. Return any product in saleable condition within 30 days of purchase for a cheerful refund or credit.

We Fix Macs

Maya's expert service technicians can save you hundreds of dollars by doing fully warranted repairs of only what's broken, all the way down to board level. We don't just swap out entire modules to fix an inexpensive component.



We Sell Macs ...one system or complete offices.

Give Maya Computer a call before you buy. At Maya Computer we use the technology we sell. Strictly Macintosh. Simply The Best!

Used Macintosh Systems with Maya's

Exclusive One Year Warranty

Macintosh 128k	\$295
Macintosh 512K E	\$625
Macintosh Plus	\$995
Macintosh Portable w/ 40meg HD	\$4757

New Equipment:

Printers:

Toshiba 24 pin dot matrix printers w/MacMatrix:	
P321 SL 24 pin	\$561
P321 SLG color	\$714
P341 SL wide carriage	\$750
P351 SX FAST 360cps	\$1165
Océ Model 5232B	
Color PostScript Printer	\$13,432
Apple ImageWriter II	\$435
Texas Instr. PS35 microLaser	\$2340



Kodak Diconix M150	
Portable Ink-jet printer w/ATM	\$522

SyQuest Drives & Cartridges:

SyQuest cartridges . 79	
DataRemovable 45 meg drive w/cartridge	\$849
MicroTech 45 meg drive w/cartridge	\$849

Video Products:

Micron Xceed 8 bit video card for Mac II or SE/30 13" Monitors	\$390
AAPPS MicroTV	\$283
E-Machines Colorpage 15	\$1199
Sony CPD1304HG 14 inch	
Trinitron Monitor	\$775

Software:

CE Software QuickMail 5 user	\$175
CE Software QuickMail 10 user	\$259
CheckMark Multilegger	\$245
CheckMark Payroll	\$183
Tops v2.1	\$138

Power Supplies:

Macintosh 128, 512 or plus NEW	\$175
Macintosh 128, 512 or Plus, reconditioned	\$125
Mac SE or SE/30 NEW	\$288
Mac II or IIx NEW	\$352
Mac IIcx or IIci NEW	\$343
Mac Plus Batteries	\$7
Also ... Hard Drives, Scanners, Input Devices, and everything for the Mac.	

See us at
MacWorld
Booth
#5528

Maya

computer

Waitsfield, Vermont

800-541-2318

CIRCLE 605 ON READER SERVICE CARD

Mac One Your #1 Discount Source For Macintosh®
POB 300 E Norwich NY 11732

MacSE/dual floppy \$1899	• MacSE20/HD20 \$2099
MacSE/30HD40 \$3199	• MacSE/30 4mb/HD80 \$3999
MacIIcx/HD40 \$3795	• MacIIcx 4mb/HD80 \$4395
MacIIci 2mb/HD40 \$4799	• MacIIci 4mb/HD80 \$5399
MacPortable/40 \$4699	• LaserWriter II NT \$3499
Ricoh PS-6000 Laserprinter (better than IINT)	\$2475

Micron Exceed 8-bit Video Card for II & SE-30 \$399
Quantum Internal Drives: 80Meg \$669/105Meg \$739
Quantum External: 40 Meg \$529 80 \$749 105 \$829
DataCopy 730GS Scanner w/ Accutext Free! \$1299
Abaton 300GS 8-bit Scanner w/s.w. bundle \$1379
Abaton INTERFAX Faxmodem 2400/9600 \$399

"We Always Beat The Competition... Call Us LAST!"

• Macs • Lasers • Drives • Scanners • Monitors

For Quotes (516) 922-2805 • FAX (516) 922-2803

Order Line Only **(800) 234-MAC** Monday-Friday 9am-6pm EST

CIRCLE 617 ON READER SERVICE CARD

Continued...

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.



The Macworld Catalog

Your 'Mac' Specialists
Mac·In·Stock™



Let Us Help You Configure Your Ideal Mac System!

Career Starter System

Macintosh SE
1MB RAM, 1.44FDHD
Apple 20MB Hard Disk
Apple Keyboard & Mouse
Imagewriter II & Cable
Microsoft Works
You Save \$1,721 !!

Retail \$4,518 **Mac·In·Stock Only \$2,797**

Executive System

Macintosh SE/30
2MB RAM, 1.44 FDHD
Apple 40MB Hard Disk
Extended Keyboard & Mouse
Hewlett-Packard DeskWriter
MS Word and MS Excel
You Save \$2,915 !!

Retail \$7,712 **Mac·In·Stock Only \$4,797**

WP/Publisher System:

Mac II CX, 5MB RAM, 80MB HD
Extended Keyboard & Mouse
Apple Portrait Display & Card
Apple Laserwriter II SC
Microsoft Word, PageMaker
Adobe Type Manager
You Save \$5,332 !!

Retail \$13,892 **Mac·In·Stock Only \$8,560**

Microsoft Specials!

Works: \$169 Word: \$219 Excel: \$229

Professional Color Tools

SuperMac 19" Color Monitor \$3195
Spectrum III 24-Bit Card/Accel \$3375
RasterOps 264 (MacII) Card \$749
RasterOps 264 (SE/30) Card \$949

Memory Upgrades

For All Macs and Laserwriter II NTX

Macintosh SE & SE/30

			SE	SE/30
w/1.44	FDHD	1M RAM	1860	2849
w/Apple	20HD	1M RAM	2149	---
w/Apple	40HD	2M RAM	2439	3219
w/Rodime	45HD	2M RAM	2659	3649
w/Apple	80HD	4M RAM	---	4095
w/Rodime	105HD	5M RAM	3259	4249
w/Rodime	210HD	5M RAM	3609	4595

Macintosh II CX & Ci

			CX	Ci
w/1.44 FDHD	1M RAM		3369	4699
w/Apple	40HD	1M RAM	3869	5229
w/Rodime	45HD	2M RAM	4099	5495
w/Rodime	70HD	5M RAM	4488	5898
w/Apple	80HD	4M RAM	5089	6499
w/Rodime	105HD	5M RAM	4769	6099
w/Rodime	210HD	5M RAM	5098	6444

Monitors

13" Color \$719, 8-bit Card \$469
Portrait Monitor + Card \$1199
Apple 2-Pg + Card \$1969
Radius 2-Pg Color + Card \$4646

Printers

Apple Imagewriter II \$437
Hewlett-Packard Deskwriter \$879
Apple Laserwriter II NT \$3539
Apple Laserwriter II NTX \$5039

Best-Priced Portables!

w/1.44 SuperDrive	
Retail	Our Price
\$5799	\$4,349
w/40M HD	
Retail	Our Price
\$6499	\$4,875



Fax Your Request: 213-322-1486

©1990 2M Group
dba Mac·In·Stock™
El Segundo, CA
(213) 322-1455

Apple, Macintosh, Mac, Imagewriter, Laserwriter, SE, SE/30, Ci & CX, Works, Word & Excel, Color, Scanline, Deskwriter & Portrait, Spectrum III, PageMaker & Freehand, ProMac, Superpaint & Digital Diskroom are products/trademarks of Apple Computer, Inc., Microsoft Corp., Rodime Systems, Hewlett-Packard, SuperMac, Aldus, Avalon, & Silicon Beach, respectively.

TERMS: Personal or business checks. Leasing available for qualified businesses. COD-cashier's check accepted at additional charge. Shipments by UPS or FedEx F.O.B. El Segundo. CA residents add sales tax. Prices subject to change without notice.

WARRANTY: We support manufacturers' warranties for the full term on all items sold. We will repair or replace at our expense.

Call Toll-Free: 800-633-1538 • Mon-Sat • 7-5 Pacific Time.

CIRCLE 692 ON READER SERVICE CARD



Shreve Systems
2421 Malcolm St.
Shreveport, La. 71108

Mac Parts!

We BUY Systems!
Trades & Upgrades-CALL!

1-800-227-3971 La. call 318-635-1121
FAX 318-865-2006

CIRCLE 644 ON READER SERVICE CARD

DATA Computer Ctr.

Tel: (213) 470-9555 Fax 470-9457
2253 Westwood Blvd. L.A. CA 90064

Laser Writer SC/NT	2095/3495
NTX/Quine Laser Printer	4795/3295
Mac Plus 1Mb 1Dr.	1245
Mac SE 1Mb 2Dr.	1795

Mac SE/30 1Mb 1Dr.	2750
Mac II CX 1Mb 1Dr.	3295
Mac II Ci 1Mb 1Dr.	4395
Mac Portable 40Mb 1Dr.	4795
Image Writer II/LQ	437/985
HP Deskwriter	875
Quantum int. 40/80/100Mb	469/795/895
Rastopape Monitors/Cards; CMS Ext. Hard Drives; Memory	
Sims in stock. All configs. & same day shipping available.	

CIRCLE 589 ON READER SERVICE CARD

For your ad to appear on *The Macworld Catalog* screen, call 800/888-8622.

The Macworld Catalog



RENTALS



\$189
per mo.

Mac SE

PC Computer Rental

Also Available:

- Macintosh • IBM PS/2
- Compaq • Laser Printers
- Laptops • Portables

And a host of other peripherals!

*Next Day Delivery
Anywhere in the U. S. A.*

Call Toll-Free

800-765-4727

CIRCLE 551 ON READER SERVICE CARD

Data Acquisition

Data Acquisition & Analysis

Complete hardware & software solutions for the scientist & engineer. Acquisition hardware & software, Analysis software, Signal conditioning modules, & Language interfaces. A friendly, knowledgeable technical staff can guide you from start to finish with proven solutions in Industrial, Scientific, Engineering & Laboratory environments. Call or write for a catalog & price list.

*BIOPAC Systems,
5960 Mandarin Dr. #D5
Goleta, CA 93117
805/967-6615*

Announcing the **SIMMER**
Adds SIMM sockets and SCSI
port to your 128/512 Macintosh

\$199 (0 Meg)

1M \$249, 2M \$389, 2.5M \$409, 4M \$579

Dealers Wanted!

1 Meg SIMMS \$79 w/Trade

Low profile SOJ 80 Nsec
Lifetime Guar. Immed. Delivery

Digi-Graphics

764 E Village Way

Kaysville, Ut 84037

(801) 544-2009



CIRCLE 610 ON READER SERVICE CARD

FREE FREE FREE

- Need memory for Mac?
- Want to pay the lowest possible price?
- Want superior service and FREE advise?

- Wholesale source!
 - Shipping worldwide!
 - Int'l FAX (402) 691-8548 (24 hrs/7 days)
 - Int'l Direct (402) 691-8248 (24 hrs/7 days)
 - Free Call! Free Info!
- Mc Donald & Associates
1-800/338-1531 Voice (U.S.)
1/800/242-5751 FAX (U.S.)
Both 24 hrs/7 days*

Emulators

II in a Mac

An Apple //e computer
...all in software!

Run Apple II software on
your Macintosh.
Convert Apple II files to
Macintosh files.

\$149.95 Add \$3 for P&H

COMPUTER:applications, Inc.
12813 Lindley Drive Raleigh, NC 27614
(919) 846-1411

CIRCLE 583 ON READER SERVICE CARD

Memory Upgrade

SIMM (Memory Modules)

Diamond-Pac™, Top Quality American made memory modules offer easy and economical expansion of Mac Plus, SE, II. DRAM by 1, 2, 4, or 8 megabytes. MC/Visa/Amex. See display ad this issue!

AMD

American Micro Distributors Inc.

16897-D Algonquin

Huntington Beach, CA 92649

714/840-5560

Fax: 714/846-0570

UPGRADES!

512Ke - Plus \$295
512K - Plus \$625
128K - Plus \$695

**We do new and used
equipment/ parts!**

RAM • Guaranteed Lowest

Peripheral Outlet

314 S. Bdwy • Ada, OK 74820

(800) 332-6581

Visa & MC okay (add 3%)

CIRCLE 687 ON READER SERVICE CARD

Continued...

EXSEL™ DIRECT

1-800-624-2001

In NY: 716-272-8770

Mac 512K.....	\$ 545
Mac Plus.....	995
Mac Plus w/20MB Ext.	1545
Mac SE.....	1545
Mac SE Dual Floppy.....	1595
Mac SE w/20MB Int.	1995
Mac SE w/30MB Int.	2095
Mac SE w/40MB Int.	2195
Imagewriter I.....	295
Imagewriter II.....	375
Laser Writer.....	CALL
Laser Writer Plus.....	CALL

**Custom Configuration Available.
Call us with your Macintosh needs.**

EXSEL™
THE ALTERNATIVE SOURCE FOR THE FUTURE

2200 Brighton-Henrietta Townline Rd.
Rochester, NY 14623

All units refurbished with 30-Day Warranty. VISA,
MasterCard, prepayment, C.O.D. certified accepted.
Prices Subject to Change.

CIRCLE 685 ON READER SERVICE CARD

DISCOUNT MACINTOSH

Mac Plus.....	\$1250
Mac SE 2 drive.....	\$1895
Mac SE 40mb.....	\$2295
Mac Portable 40mb.....	\$4895
Mac SE/30 40/2mb.....	\$3395
Mac SE/30 80/4mb.....	\$3995
Mac IICx 40/2mb.....	\$3795
Mac IICx 80/4mb.....	\$4395
Mac IICi 40/2mb.....	\$4895
Mac IICi 80/4mb.....	\$5495
Apple color monitor.....	\$725
Apple 8 bit video card.....	\$480
Apple keyboard.....	\$100
Apple ext keyboard.....	\$175
Imagewriter II.....	\$450
Laserwriter NT.....	\$3495
Laserwriter NTX.....	\$4795
H.P. Deskwriter.....	\$845

All items new. 90 day warranty
Most items in stock today.
Visa and Mastercard add 2%.

KIWI COMPUTERS

P.O. Box 67381

Los Angeles CA 90067

(213)553-4507

Fax (213)286-9667

Mon-Fri 8.30am-4.30pm

CIRCLE 608 ON READER SERVICE CARD

MAC Systems

Mac SE 2D \$1949 • SE 1D 20 mg.
\$2349 • SE/30 1 Dr. \$2999 • SE/30 4
MB 80MB \$4199 • Mac IIX All models
• Call • Mac IICx • Call • Mac II CI •
Call • Mac II 13" Monitors \$699 • Mac
Sync monitor \$549 • Mac Portable •
Call • Image II \$415 • Laserwriter SC
\$1919 • Laserwriter NT \$3388 •
Laserwriter NT \$3388 • Laserwriter
NIX • \$4699 • HP Scanjet plus & Mac
interface \$1399.

C.C., 818/894-1100,
FAX 818/891-3285

For your ad to appear on *The Macworld Catalog* screen, call 800/888-8622.



FREE FASTdrive™

RAM Disk software with purchase
of 4MB or 1MB Mac SIMMs
Gives you up to 32MB of Mac Memory!

- FASTdrive™ delivers the power of System 7 today.
- Run a full 8MB of Operating System Memory and up to 24MB of RAM Disk.
- FASTdrive™ can be set up as the startup application and is 60 to 120 times faster than your hard drive.

LaserWriter II NTX SIMMs Now Available

- Add up to 12MB to any LaserWriter II NTX.
- Makes printing faster and does not tie up internal memory.
- Get back to applications sooner.

Available for immediate delivery! Call Our Memory Hotline
For Prices and Discounts

1-800-678-DRAM (678-3726)
©1990, Newer™ Technology

Newer™
TECHNOLOGY

1117 S. Rock Rd., Suite 4
Phone (316) 685-4904
FAX (316) 685-9368
Wichita, KS 67207

In Canada Contact: Tallgrass Technologies, Canada, Inc.
1775 Meyerside Drive #1 • Mississauga, Ontario L5T 1E2
(416) 673-3244 • FAX (416) 673-3926

CIRCLE 631 ON READER SERVICE CARD

MEMORY UPGRADE

Buy 4 Megabytes Get FullWrite Professional **FREE**

Technology Works and Ashton-Tate have a special 1990 offer. Buy 4 megabytes of memory and get FullWrite Professional FREE. As always, offer includes Technology Works great low price, lifetime warranty and installation kit with every purchase. Call for details:

(800) 622-2210

PO FAX#:(512) 794-8520
Same day shipping

TechnologyWORKS

4030 Braker Lane West
Suite 350
Austin, Texas 78759

FullWrite offer valid through 3/31/90--or while supplies last.

CIRCLE 690 ON READER SERVICE CARD

One of the Nation's Fastest Macintosh™ Upgrade/Repair Facilities is Growing!

SIMMONS CONSULTING IS NOW SIMMONS MICROSYSTEMS



Same Day Turn-Around - Nationwide
30 Minute Turn-Around - Locally

- New and Used Macintosh Systems Available
- 120 Day Warranty on New Equipment - 90 Days on Used!
- Requests for Quotes Via FAX
- Nationwide Leasing Capabilities for Businesses
- Dealer Inquiries Welcome

SIMMONS
MICROSYSTEMS

6417 Market St.
Upper Darby, PA 19082

(215) 352-6883 Ext. 30
FAX # (215) 352-6975

CIRCLE 616 ON READER SERVICE CARD

Mail order
can save
you time—
and money!

For your ad to appear on *The Macworld Catalog* screen, call 800/888-8622.



Below is a list of companies who have advertised SIMMs in past issues of MacWorld Magazine

January 1988

PSI
CDC
DMS

August 1988

PSI
Computer Care
SIMM City
Palo Alto RAM

June 1989

PSI
AMD
CDC
Computer Care
DMS
Newer Technology

PSI, a leading manufacturer of Macintosh peripherals since 1987, is always on the cutting edge of technology. We were the first with our 4 meg SIMMs, the first with a RAM upgrade for the Mac Portable, and the first with our Fax/Data modem for the Portable. Other companies may come and go, but PSI is always there, always the innovator, always the leader.

1 meg SIMMs, 4 meg MIMMs, NTX SIMMs, Portable RAM, Fax/Modem

800-622-1722

408-559-8544

PSI 2005 Hamilton Avenue, Suite 220, San Jose, CA 95125

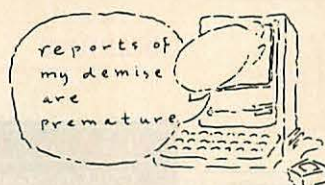
CIRCLE 634 ON READER SERVICE CARD

Mac RescueTM for the Classic Mac

Some "experts" are telling us to trash out the 128K and 512K Macs. Don't do it! Classic Macs are far from moribund. Computer Care developed Mac Rescue, a daughter board that snaps on the enhanced Classic Mac motherboard. No need to fold, spindle or mutilate. Installs in minutes to get Mac Plus functionality.

Mac Rescue has 6 SIMM slots so you can upgrade the Classics to 1 meg, 2 megs, 2.5 megs or 4 megs of RAM.

It also has a SCSI port to breathe even more life into your faithful servant.



Limited time offer: We'll buy back your old fashioned expansion boards when you order Mac Rescue, call for exact price quote.

Ford Centre, Suite 1180, 420 North Fifth St.
Minneapolis, MN 55401
(612) 371-0061 (800) 950-CARE (2273)

C Computer
Care,
Inc.

Dealer inquiries welcome.
Visa/MC accepted.

CIRCLE 584 ON READER SERVICE CARD

Call Up Your Ad On Our Screen.

The Macworld Catalog.
800.888.8622

Continued...

For your ad to appear on *The Macworld Catalog* screen, call 800/888-8622.



The Macworld Catalog

- 80 & 70 ns Speed
- Low Profile, Surface Mount
- High Quality 4-Layer Board
- Lifetime Warranty
- Visa, MC, No Surcharge
- Same Day Shipping

1MB & 4MB SIMMs for all models:

\$Lowest

Parity SIMMs available LaserWriter II NTX SIMMs in stock

SOUTH COAST ELECTRONICS

10920 Wilshire Blvd. Suite 1100
Los Angeles, CA 90024

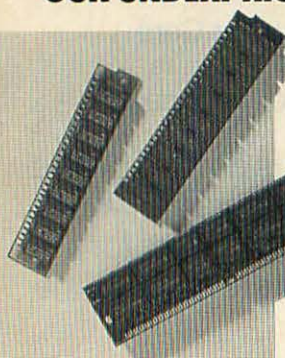
213-208-3260 Fax 213-208-3282

800-289-8801

CIRCLE 654 ON READER SERVICE CARD

**DEPEND ON
OUR SIMMs.**

**DEPEND ON
OUR UNDERPRICES.**



NECS
NEW ENGLAND
CIRCUIT SALES, INC.

292 Cabot Street, Beverly, MA 01915
Telephone: 508-927-8250 Telex: 882-685-NECS UD. Telefax: 508-922-1341

- Our SIMM prices absolutely can't be beat, we buy in quantity, and pass the savings on to you.
- Lifetime overnight replacement warranty, we'll replace any NECS SIMM for any reason within 24 hours of your phone call.
- Every order shipped directly from stock—no backorders.

With over ten years of industry experience, NECS is one of the most advanced and dependable semiconductor distributors in the world. Building from this technical expertise, our Memory Division now offers SIMMs at unbelievable prices for all your MAC expansion needs. Let us prove that our prices—and quality—can't be beat. Call now for immediate cross-referencing and delivery.

Call and ask for our Memory Division at 1-800-922-NECS.

CIRCLE 562 ON READER SERVICE CARD

9-Track Tape Subsystem For the Macintosh™



Exchange data files between your Macintosh and any mainframe or mini-computer using IBM compatible 1600 or 6250 BPI 9-track tape.

Unit can also be used for disk backup. Transfer rate is up to 1 megabyte per minute via your SCSI interface. Subsystem includes, tape drive, software, and complete documentation. For more information, call us today!

QUALSTAR®

9621 Irondale Avenue
Chatsworth, CA 91311
Telephone: (818) 882-5822

Macintosh is a trademark of Apple Computer, Inc.

CIRCLE 668 ON READER SERVICE CARD

Printers

Apple Daisywheel Printer
TRUE letter quality on all Mac's & Apple II's. Fast 40 char./sec. on 1-pg./6-part forms, fixed or proportion font, 198 columns, bold. **NEW \$449**, **RECOND. \$349** incl. easy mac point-&-click printer resource, I/F cable, ribbon, & \$10 print wheel w/dual font, math, legal, foreign symbols. *New sheetfeeder \$49.* Commercial quality w/ 90-day guarantee.
Quality Discount Computers Inc.
135 Artist View Dr.
Wellington, NV 89444
702/465-2473, 415/487-8148

Scanners

Peripherals

REMOVABLE HARD DISK STORAGE

FOR THE MACINTOSH

HARD DISK CARTRIDGE SYSTEMS

- Random
- Unlimited Capacities
- 20MB to 50MB Capacities Available
- Proven Winchester Technology
- Maximum Data Security
- Image Back-up
- 100% Media Interchangeability
- 24 Month Warranty

Model 181ES Removable Hard Disk System \$1345.00
See your local Macintosh dealer or call 1-805-694-0733

DMA Technologies, Inc.
601 Pine Ave., Goleta, CA 93117

Call 805-964-0733 for Information
Fax Inquiries: 805-964-0734

CIRCLE 580 ON READER SERVICE CARD

SHARP IS COLOR - AIP SPECIALS

COLOR SCANNERS/ LAPTOPS & MORE FOR IBM & MAC

JX-100-8 Bit Hand Color Scanner.....	\$ 995.....	NOW \$ CALL
JX-300-Business Color Scanner.....	\$ 3995.....	NOW \$ CALL
JX-450-Professional Color Scanner...	\$ 6995.....	NOW \$ CALL
JX-600-Commercial Color Scanner.....	\$ 14995.....	NOW \$ CALL
GPIO-Interface Package W/Cable.....	\$ 570.....	NOW \$ 448
JX-730-Color Ink Jet Printer.....	\$ 2195.....	NOW \$ 1485
JX-9500-SHARP Laser Printer.....	\$ 1695.....	NOW \$ 1085

AIP

'BUY' CALL US - LET'S MAKE A DEAL 'LEASE'

TEL: (818) 882-7034 FAX: (818) 341-3017

CIRCLE 645 ON READER SERVICE CARD

**Call Up
Your Ad
On Our
Screen.**

The Macworld Catalog.

800.888.8622

For your ad to appear on *The Macworld Catalog* screen, call 800/888-8622.

The Macworld Catalog



Software

Bar Code

PrintBar Fonts for Macintosh

UPC-A, UPC-E, EAN PostScript® fonts for LaserWriters and high-resolution printers such as the L-300. Code 39 and 12 of 5 for ImageWriters and LaserWriters.

Use PrintBar with database managers, label, DTP and drawing programs. Print bar codes as easily as printing text.

Complete Line of Mac-Compatible Bar Code Readers.

FREE BROCHURES CALL (916) 622-4640 • FAX (916) 622-4775

BearRock

6069 Enterprise Drive • Diamond Springs, CA 95619

CIRCLE 567 ON READER SERVICE CARD

Bar Code Fonts



Instant BusinessTools

BizPlanBuilder™ 4.0 Intuitive & logical business & marketing plan template on diskette for raising capital, launching new products or services. 90+ pages of outlines, headlines, written texts & ideas... formatted into 33 MacWrite/MSWord files. Sales & marketing oriented—follow tutorials, fill-in-the-blanks, edit into a finished plan. Linked financials in Excel (SYLK). Proven successful. \$99+shp

"We applied for a loan in early November and by Christmas we had \$4,200,000."

"My CPA highly recommends it."

Companion software packages:

- Employee Policies Handbook \$99
- Sales Quota/Forecast Mgmt mgrs+reps \$149
- Production Financial Model \$149
- Private Stock Offering raise up to \$1Mil \$149
- Limited Partnership Agreement \$149
- DealMaker™ Business Valuation \$395

+shipping

800/ 442-7373

415/ 941-9191 CA Visa-MC-Ax

Leverage time & technology—save \$

CIRCLE 663 ON READER SERVICE CARD



Military Art

NEW! Defense graphics library designed for military and industry professionals. Call for FREE brochure. V/MC/PO's COD. PAINT • HYPERCARD • PICT • EPSF

817-737-7941

NOVA Cube 1704 Tremont Ft Worth TX 76107

CIRCLE 650 ON READER SERVICE CARD

Business

Filemaker Templates

for small business and personal use. Modules available for:

- Service Business
 - Construction Industry
 - Professionals
 - Personal Finance
- One-write checking, GL, A/R, A/P, master mail, labels, job costing, PO's, invoices, statements, reports, more! Integrated. Comprehensive! Easy setup/ full support! \$149. Visa/MC, info call:

Fine Line

459 Liberty Square Rd.

Boxboro, MA 01719

508/263-4322

1-800/955-4320

Mail Order Manager

SuperMOM—a complete database solution for catalog mail order businesses. Easy order entry • unlimited ship-to addresses • Inventory with multiple pricing • A/R • UPS • Credits & returns • Customer tracking by Group, Market, Promo & Salesman • Thorough reporting on sales, inquiries, & advertising response • Demo \$15

National Tele-Press

P.O. Box 79

Mendocino, CA 95460

707/927-2848, 800/448-0988

LOANS & LEASES

Making Attorneys, Accountants, Bankers, Real Estate and Financial Professionals more profitable! Over 11,300 Users!

Amortization Any Loan, Balloons, Variable rates and payments, Biweeklys, Extra and Skipped Payments, APRs, Points & Fees, 360/365 Days, Exact-day interest, negative amortization, Solve For Unknown Variable. Create your own Custom Reports.

Accounting Tracks loan & rental payments and late penalties for entire portfolios or single accounts. Record payments as they are made. Summary reports of Portfolio activity and daily entries. Delinquency reports.

Comparison Compare and analyze 5 types of loans at once. Choose from several comparison reports. For new loans or refinancing.

Customization Available

Call or write for

FREE Sample Reports & Brochures and

FREE Desk Accessory Offer

Softlair • 8753 Parkway • Milwaukee,

WI 53226 (414) 797-4490

Add \$5 S/H MC/VISA

CIRCLE 649 ON READER SERVICE CARD

100 Templates for Excel

Save time and money with Templicity™ — spreadsheet templates for home and small business. Includes ready-made worksheets for personal financial planning, budgets, home office, real estate, 1989 taxes, bookkeeping, and many other unique applications. Satisfaction guaranteed. All 100 templates - \$34.95.

The Sterling Connection

Box 4850, Dept. N

Berkeley, CA 94704

415/ 655-2355

CAD/CAM

Professional CAD Symbol Library

Over 2,700 CAD Symbols in One All-Inclusive Package



Architectural (Residential & Commercial), Interior Design & Site Planning, The "Plumbing & Heating Supply House", The "Hardware Store", The "Electronics Shack", Welding, General Drawing Aids, Cartographic, 180+ Page User's Manual, And Much More, All for \$119.95!

Advanced System Design, Inc. Compatible with ClarisCAD™ and MacDraw II™
1010 Stagecoach Blvd., P.O. Box 3131
Evergreen, Colorado 80439
(303) 674-2222 to Order (Specify ClarisCAD or MacDraw II Version)

CIRCLE 643 ON READER SERVICE CARD

Clip Art

FREE!!
CIRCLE THIS AD NO. AND GET A
FREE MAXXI FOLDER ABOUT OUR
CARTOONS. FREE HOW-TO DISK
ON PAGE/TYPE DESIGN INCLUDED
WITH EACH ORDER.

PO BOX 31165,
SEATTLE WA 98103-1165
1-800-842-9327

CIRCLE 621 ON READER SERVICE CARD

Clip Art Maps!

- Paint
- Draw
- EPSF



From \$79

World, Continents, USA & states by county! Ideal for publications and presentations. For FREE brochure please call or write:

800-334-4291

MicroMaps Software, Inc., Box 757, Lambertville, NJ 08530

CIRCLE 625 ON READER SERVICE CARD

Communications

Burroughs emulation

Contact™ emulates TD/MT/ET and T27 terminals. Sophisticated data capture — all screen data can be used by spreadsheet, database or word processor... CANDE file transfer, fully à la Mac interface, soft keys, multiple pages & addresses, password protection... Soon: advanced file transfer

Avenue Software Inc.

1173 W. Charest Blvd. #390, Québec, Qc
Canada, G1N 2C9 — Tel. (418) 682-3088

CIRCLE 564 ON READER SERVICE CARD

For your ad to appear on *The Macworld Catalog* screen, call 800/888-8622.



The Macworld Catalog

Desktop Publishing

Avenir™ Lino & Color PS!

- Lino output to paper/film
 - Color PostScript® output
 - Mac, DOS or PostScript®
 - Canon 4-color laser copies
 - 24-hr access via modem
 - Credit cards welcome
- Low prices & great service! Call today for an info packet.

Avenir™ Corporation
3141 Federal Blvd.
Denver, CO 80211

303/433-8000, 800/AVENIR-IT
800-283-6474

Questions?

Desktop Publishing? Graphics? Arts?

Call us. We'll send you a newsletter and catalog. For the best prices around and real support on word processing, page layout and graphics programs. "I'm glad I called"

1-800-MAC-BEAT!



CIRCLE 648 ON READER SERVICE CARD

Educational

Algebra 1 Homework Tutor™

Turns your Mac into a private tutor that actually helps you do your Algebra homework. Checks each step, gives hints, create unlimited practice problems. Solves & explains examples while you watch. Full Mac interface plus "smart" math editor that's easier than pencil & paper. \$119.95 chk/MO or call for free brochure.

Missing Link Software
P.O. Box 3280
South Amboy, NJ 08879
800/222-9296

Courseware for Learning Grammar / Composition

Nuts & HyperBolts...Remedial grammar tutorial, 5 disk multi-stack set with drills \$189.95. Runs on MacPlus & up and also networks. For high school and college students.

SwiftNotes...Do your compositions note cards, sort by key words, paste in your word processor, also two styles bibliography references \$44.95. Both need 1 Meg Ram & HyperCard.

Sterling Swift Software, P.O. Box 43325, Austin, TX 78745-0009, 512-280-2431

CIRCLE 600 ON READER SERVICE CARD

TEST GENERATION & SCORING!

LXR-TEST™ 4.0 is the most advanced testing system available. Full character styling (tabs, leading), exact graphic placement, database selection, scoring, mastery reporting, item analysis, and much more! Certified question banks available from major exam publishers.

For free presentation disk, call, write, or fax:

Logic eXtension Resources
9651-C Business Center Drive
Rancho Cucamonga, CA 91730
(714) 980-0046 Fax: (714) 987-8706

CIRCLE 614 ON READER SERVICE CARD

Free MakeTest Demo Disk

New, easy-to-use software stores questions and print tests easily in any format. Has features teachers most want at an affordable price. Only \$149, 30-day money-back guarantee. To order MakeTest or demo disk, call 800-669-6574 or 415-665-5302.



MOUNTAIN LAKE
SOFTWARE, INC.

258-B Laguna Honda Blvd.
San Francisco, CA 94116-1409

CIRCLE 627 ON READER SERVICE CARD

Teacher's Rollbook

A complete classroom management tool! Grade averaging and reporting. New quick grade entry • Full attendance records and totals • Records disciplinary actions • Class size reports • Up to 315 students per file • Remember birthdays & checked out items • Letters to parents • Min. req. Mac 512KE, 2 drives • \$99 • Demo \$10.

Current Class Productions
22824 Berendo Ave.
Torrance, CA 90502
213/326-4246

An all new edition of the Macintosh Educational Software Collection

- Hard-to-Find & Best Sellers
- HyperCard / Shareware
- Over 150 Titles
- All Subject Areas
- Teachers, Students, Parents

Send for Free Catalog!

CHARIOT • 3659 India St. • San Diego, CA 92103 (619) 298-0202

CIRCLE 575 ON READER SERVICE CARD

The most readers. The least cost. Immediate access. Just call *The Macworld Catalog* at 800.888.8622 and place your ad—today!

800.888.8622

Reference Manager

Find your references, notes, ideas, when you need them—organize by topic—search by keyword/topic/key fields (output to screen, printer, file [WP comp.])—file import/export—Bibliographic output flexible format—cross reference—bookmark facility—save time—HyperCard incl.—Personal Reference Catalog V2.0—\$79 + \$3 s/h, edu. disc. avail.

Delphinus Inc.,
POB 458
Groton MA 01450
508/448-2836

Engineering

CIVIL, STRUCTURAL SURVEYING, DEED PLOTTING

LANDesign™

COGO/Surveying

- Graphics always visible
- Import/export data
- Deed plot, map check
- Radial stakeout
- Intersections
- Traverse adjustments
- US\$595 plus shipping

FRAME mac™

Structural Analysis

- Frames, trusses, beams
- Enter data graphically or numerically
- Full graphics for structure, loads, axial, shear, moment, deflection
- US\$595 plus shipping

One-month money-back guarantee. Free support.

- Other programs available for:
- Deed plotting
 - Road design
 - Contour mapping
 - Terrain modeling
 - Earthwork calculations
 - Estimating
 - Detention pond design
 - Digitizer input
 - Structural design of steel, wood, concrete
 - Beam sizing
 - Structural properties
 - Section tables AISC, CISC
 - Aggregate blending
 - Unit conversions
 - Plotting

For free catalog or info, call or write:

COMPUeering® (416) 738-4601
Engineering Software for the Macintosh
113 McCabe Crescent
Thornhill, Ontario L4J 2S6
CANADA

CIRCLE 581 ON READER SERVICE CARD

Schematic Entry/Digital Simulation

DesignWorks™

Fully integrated and fully functional schematic and simulation on the Macintosh, featuring:

- fully interactive digital simulation with logic-analyzer style timing display
- fully compatible with Douglas CAD/CAM™ PCB layout
- full 7400, 4000, LSI, analog libraries
- full high level language PLD support when used with LPLC logic compiler
- dot-matrix, laser, pen plotter output
- user-definable device symbols with full simulation

DesignWorks: \$685 LPLC: \$535

Low-cost educational versions also available

Capilano Computing
545-108th NE, Suite 6
Bellevue, WA 98004
(604) 669-6343

CIRCLE 573 ON READER SERVICE CARD

For your ad to appear on *The Macworld Catalog* screen, call 800/888-8622.

The Macworld Catalog



E(E)PROM, MICRO & MEMORY CARD PROGRAMMERS WITH INTEGRATED MAC USER INTERFACE



\$345 - 595

- Connects to modem port. Pull-down commands menus.
- No personality modules for E(E)PROMs & Intel Micros.
- All 24/28/32 pin EPROMs to 1 MBit (upgradeable to 32 Mb).
- 8741, 2, 4, 8, 8H, 9, 9H, 51, C51, 52, 55, 9761; EEPROMS.
- Memory Cards (Seiko/Epson/GI); Flash EPROMs; On Board Programming capability; Modular design; Easy F/W upgrades.
- Stand alone E(E)PROM and Memory Card duplication/verify.
- Offset/split Hex, Binary, Intel & Motorola 8, 16, 32 bit.
- Built-in Eraser/Timer option (\$50); Gang Module ready.
- Direct technical support; Full 1 year warranty.

VISA MC AMEX Call today for datasheets!

B&C MICROSYSTEMS

355 WEST OLIVE AVE, SUNNYVALE CA 94086
PH: (408) 730-5511 FAX: (408) 730-5521 TELEX: 984185

CIRCLE 565 ON READER SERVICE CARD

IEEE 488 Interfaces

Workbench • Icon-driven software
Labtech Notebook • Menu-driven software
MacII488 • NuBus IEEE board for Mac II
MacSCSI488 • SCSI/IEEE controller
Mac488B • Serial/IEEE controller
MacSerial488 • IEEE plotter interface
MacDA488 • IEEE desk accessory
MacDriver488 • IEEE language driver

Call or send for your
FREE Technical Guide

(216) 439-4091

IOtech
IOtech, Inc.
25971 Cannon Road
Cleveland, Ohio 44146
Telex 6502820864
Fax (216) 439-4093
Reading (0754) 57-56 66 • Plainfield (1) 34810170 • Zurich (01) 821-94 44
Milan (02) 4154668 • Linköping (013) 110143 • Göttingen (01) 63035333
Munich (089) 305022 • Sydney (02) 950-6064 • Seoul (02) 678-7457

CIRCLE 606 ON READER SERVICE CARD

Mac Frequency Analysis
Turn your Mac into a Work Station.
Spectrum: A Mac Program to do
Frequency analysis. Fast: 4096 point
FFT in 1.25 Secs with Mac II. Data
windowing. Flexible: Can analyse text
or Mac binary files. Magnitude linear
or log and Phase plots. Save all
information to a text or binary file. Can
print the plots.
Equinox Technologies
7230 Oliver Street
Lanham, MD 20706
301/577-9207

Documentation Systems

A 219 category part numbering system
for inventory, drawings, assemblies,
artwork, procedures, specifications,
main models and accessories. Forms
include vendor quotation, buycard,
ECO, ECR, MDR, and ECO/ECR
procedures. A manual/integrated
system than can easily move into MRP
systems. \$109 CK/MO/PO.
Stephens Engineering
P.O. Box 61076
Sunnyvale, CA 94086
408/730-2240

**DATA ANALYSIS
DIAGNOSTIC WORKSTATION SOFTWARE**

AIM® software automatically determines the functional relationships
contained in raw data. It is fast and accurate. It eliminates variables
of little importance, and it does not overfit the function to the
remaining data points.

Input - Your database with up to 25 variables
Output - Least Predicted Squared Error (PSE) polynomial,
and implementation network.

With AIM® software your Macintosh can be used as a powerful
diagnostic workstation to analyze data from: observations, historical
statistics, simulations, or expert generation. Many AI/Machine
Learning features are included.

INPUT (Database)
OUTPUT (Equation/
Network)

1M Mac Plus, SE, or II
\$495

Program Support Associates
2340 Commonwealth, Suite 100
Charlottesville, VA 22901
(804) 973-2564

VAX Version and C Code
Generation Module Available

CIRCLE 587 ON READER SERVICE CARD

Road Design

MacRoad is an application for
geometric design of roads. Features
include: interactive graphical design of
cross section & profile, quantity
calculation, printing & plotting of
drawings, save in PICT format,
calculation of superlevation & spirals,
3D drive through simulation. Demo
available.

Creative Engineering
6 Antill St.

Wilston Queensland 4051 Australia
+61 73566271

RFDesigner™

...a powerful productivity tool for nodal
analysis and gradient/random/yield
optimization of complex RF/Microwave
electronic circuits. Full Test/Graphic
Mac interface. Options: full-featured
schematic capture, Network Analyzer
interface, S-Parameter Library. Works
on all Macs (1-5MB). Starts at \$1,500.
ingSOFT Limited
213 Dunview Ave.
Willowdale, Ont M2N-4H9 Canada
416/730-9611

Orbital Mech

A Spaceflight Simulator

Honorable Mention: Simulation Category
MacWorld Game Hall of Fame '88

"Challenging, educational, fascinating...
the documentation is delightfully thorough and humorous...
Playing Orbital Mech affords a great opportunity of
something as basic as an apple, changing from a tree!"
Keith McCandless, MacWorld, April '88

"Orbital Mech is a marvelous
introduction to the vast world
of space travel."
"It is a masterpiece!"
[By Newwood LPI, October '88]

For \$12K thru Mac IIx
\$49.95 U.S.
Includes S&H, sales tax
Studio Zero
6212 Samuell Blvd.
Suite 153
Dallas, TX 75228

1-800-752-9222 x933 VISA/MC/AMEX

CIRCLE 594 ON READER SERVICE CARD

STAMP, COIN & BASEBALL CARD COLLECTORS!



Three powerful, yet easy-to-use
collectible inventory programs.
• Built-in prices & descriptions.
• Prices updated annually.
Demo \$15. Call for FREE catalog.
COMPU-QUOTE
6914 Berquist Ave. Dept. CM
Canoga Park, CA 91307
800/782-6775 ext. 39
In CA 818/348-3662 ext. 39

CIRCLE 578 ON READER SERVICE CARD

Entertainment

Tired of Arcade Games?

Try the challenge of battle strategy simulation. 12 original games. Rommel's DESERT WAR • MIDWAY or SOLOMONS
carrier actions • Rome's glory in BARBARIAN or EAGLES IN THE SAND • Civil War action in WESTERN CAMPAIGNS or
ARMY OF NORTHERN VIRGINIA • US/Soviet dashes in NORWEGIAN SEA or US invasion in RED STARS • Patton's
attack on Russia (IRON FIST) • Hannibal's War With Rome (EAGLE & CRESCENT) • US War in Vietnam (CONQ!)
\$39.95 each + \$3 S&H (\$5 Overseas). VISA & MC Accepted. 1Mb Req. Specify machine. IL res include 6.5% tax.
WarTime Simulations™ (Div. of SJP Ent) PO Box 246 McHenry IL 60050

CIRCLE 647 ON READER SERVICE CARD

Go - meet your NEMESIS™

Go has been a way of life in the Orient for over 4,000 years. As much a
philosophy as it is a game, Go is considered by many to be the secret of
Japanese success. "the leading Go game for the Macintosh...Using it is
an improvement over learning the game from books or from all but the
most patient humans." "This is without question one of the most extra-
ordinary automated aids to go instruction developed." MacWorld 6/89

Toyogo, Inc.
(800) 4-TOYOGO

76 Bedford Street, Suite 34-C, Lexington, MA 02173 (617) 861-0488
\$79 NEMESIS Go Master, \$49 Joseki Tutor, \$59 Tactical Wizard+ \$6 US S&H

CIRCLE 665 ON READER SERVICE CARD

Continued...

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.



The Macworld Catalog



\$49
2 disks

BirdSongs!

Enhance your Macintosh workstation with the sounds of real birds that sing in the background. These professionally digitized bird-songs are played at random or by menu selection, and do not interfere with the foreground application. Forty songs are included in this two-disk set. A hard disk drive is required.

Dial 505-897-4024 Visa-MC

Corrales Software

POB 2730 Corrales NM 87048

CIRCLE 691 ON READER SERVICE CARD

Fonts

PostScript® Font Software

SAVE UP TO 35%
Off List Price

Authorized Dealer For:
Adobe Image Club
Bitstream Linotype
Casady & Greene Monotype

1-800-248-FONT

PRECISION TYPE 516-348-6777
505 OLD WILLETS PATH, HAUPPAUGE, N.Y. 11788
*PostScript is a registered trademark of Adobe Systems Inc.

CIRCLE 609 ON READER SERVICE CARD

**Your Ad
Gets More
For Less.**

800.888.8622

Genealogy

REUNION™
the family tree software

Reunion quickly records and displays family information and images. Click to navigate through generations of ancestors. Create large, COLOR, graphic descendant and pedigree charts.

Family groups • histories • mail lists • calendars • user-defined fields • mail merge • GEDCOM. \$129 plus \$4 s&h. Visa/MC welcome. Call or write for a free brochure and sample printouts.

LEISTER PRODUCTIONS
14 Hill Blvd., Mechanicsburg, PA 17055
717-697-1378

CIRCLE 613 ON READER SERVICE CARD

MacGene™

"Genealogy Research Made Easy"
Automate your family album with treecharts, statistics, histogram, folklore...Define your own fields, searches, reports, mailer, etc. Features: Auto link/generation, external files, Publish Ready, plus more... the FASTEST...

- NOT HyperCard • NOT IBM Port
- \$145 Visa/MBG • Demo \$25

Applied Ideas Inc.

P.O. Box 3225

Manhattan Beach, CA 90266

Order/Free Info: 213/545-2996

Family Heritage File™

Most powerful genealogy program on Mac. Rated "BEST" by Macworld. Designed by genealogy professionals (LDS Church)

- Enhanced • Fully relational • Graphic Pedigree, Family Group, Individual, Marriage, Surname • Unlimited History
- Sorted Lists • Export to WP/data base/modem. \$149 + \$5 s/h. Demo \$7. Visa/MC. Free Lit Pak.

Star.Com Software,
Windsor Park East
25 West 1480 North
Orem, UT 84057
801/225-1480

Family Roots™

Do it YOUR way! Huge variety and capacity for your family history. Make pedigree charts, descendants charts, person sheets, group sheets, indices and much more. Customize to your own preferences. Standard Mac interface. Call for FREE information.

Satisfaction guaranteed MC/Visa/AE.

Quincept

Box 216

Lexington MA 02173

617/641-2930, 800/637-ROOT

Health

Analyze Diets, Menus...

so much more with the FOOD PROCESSOR II! This TOP-rated software has the best database of any system on the market today! Used by USDA, schools, colleges, hospitals, fitness centers & health programs. •2400-3000 foods - 30 nutrients. \$295 •CALL OR WRITE TODAY FOR FREE DEMO DISK!

ESHA Research

P.O. Box 13028, Dept. D

Salem, OR 97309

503/585-6242

HyperCard Stacks

You can learn French, German, Russian, Spanish or Latin the efficient way with MacFlash Cards!

Powerful, yet easy to use. Over 2000 words & 1000 synonyms. Learn vocabulary fast! Can be used as a "point and click" dictionary. Use "Look Up" to find just the right word. 43 pg manual. German I/II, French I/II, Russian I, Spanish I, Latin I: \$25 each. S&H \$3, CA Res add 7% tax. Money-back guarantee. Call or send for additional information. Order today by calling 1-800-283-4080 X850

The Language Quest Software Company
101 First Street, Suite 428, Los Altos, CA 94022

Same Day Shipping
Quality product: low price

CIRCLE 683 ON READER SERVICE CARD

Dialoger™ for HyperCard®

Dialoger is a complete environment for the design, creation and control of any kind of dialog window - entirely within HyperCard. Create dialogs in just minutes - without writing a line of script. Dialoger was created with both the "novice" and "power user" in mind. Using color, lists, popups and its interactive control, you can break through HyperCard's limits. \$94.29

theResult Software, Inc.
111 Providence Road
Chapel Hill, NC 27514
919/493-7250

ГиперКарта от ГиперГлота

OUR NEW KANJIMASTER
ON 12 DISKS WITH EXTENSIVE SOUND, \$149.00

COMPLETE SPANISH
COURSE WITH EXTENSIVE
SOUND, 149.00

Products in Russian, French, & German, too!
Call or write for our free catalog today!
The HyperGlot Software Company, Dept MW
505 Forest Hills Blvd. Knoxville, TN 37919
(800)726-5087

CIRCLE 602 ON READER SERVICE CARD

For your ad to appear on *The Macworld Catalog* screen, call 800/888-8622.

The Macworld Catalog



ADD SPREADSHEET CAPABILITY TO STACKS

Trendware XCAL™ allows you to integrate calculations into new or existing stacks. Initiated from HyperCard's standard menu, XCAL displays a spreadsheet-like grid over cards in your stack. Clicking over HyperCard items in the grid window lets you create formulas for fields & buttons similar to those available with most stand-alone spreadsheet programs. Over 100 functions built-in!

Performs calculations automatically on numerical data, text and dates when data is entered or an item is clicked. Apply numeric, text and date formats to fields. Fields are reformatted automatically when data is entered! Calculations can be performed on groups of cards and subsets that match a search criterion. Use the built-in macro editor for advanced capabilities. \$149.95

HyperTools™ #1 Icon Editor, Alignment & Array Creation Tools, Script Analysis Tools, use the Font Tools on groups of fields & buttons, Checkboxes, XCMD tools, Button Tools & more. \$99.95

HyperTools™ #2 Add Multiple Choice Lists to Fields, Field Sorting, Data Formatting & Validation, Sound Tools, Group Tools for moving & copying groups of objects, Card Reordering & more. \$99.95

Stack Cleaner™ Add menus to stacks with the Menu Editor. Plus utilities to merge, split, clone and reduce the size of scripts. Plus ResCopy from Apple. Now includes utility to compact all stacks on your disk. \$49.95

HyperTools: "The tools and utilities in these two packages (16 in each program) are powerful, and they can definitely help stack authors take fuller advantage of HyperCard's potential." - MacWorld, Dec 88

Trendware Corporation PO Box 2285 Huntington, CT 06484 (203)926-1116

CIRCLE 667 ON READER SERVICE CARD

The Bottom Line:

There's no easier, faster, or more economical way to get your message in front of today's volume mail order buyers than to advertise in *The Macworld Catalog*.

Call 800/888-8622
to reserve your space today!

Languages

MACTRAN PLUS

This versatile Integrated Made-for Mac Development System Includes: Editor, Optimizing, Compiler, Source Level Debugger, Linker, Library Manager. Supports: 68020/68882 in-line code generation. Significant VAX FORTRAN & ANSI 8X extensions. Comprehensive MAC Tool Box Interface. Unlimited code segment size.

DCM DATA Products
610 One Tandy Center
Fort Worth, TX 76102
817/870-2202

Fortran on Your Desktop

No need to wait for time on the "big" computer any longer. Language Systems Fortran lets you run the same high performance Fortran programs at your desk. VAX-compatible extensions, high precision IEEE floating point data types, complete access to Toolbox, direct code generation for the Mac II, and the MPW programming environment make this compiler the most powerful Fortran for the Mac.
Language Systems Corp.
441 Carlisle Drive
Herndon, VA 22070
703/478-0181

Medical

CMAMedical™
CMADental™

CMA Micro Computer
50688 Yucca Trail, Suite 5
Yucca Valley, CA 92284

Quality, Speed & Versatility

Compare these Features:

Paper Claims	Electronic Claims	SuperBill	Patient Ledger	Financial	Diagnostic	Data Base
Appointments with Recall	Management Reports	Production Analysis	Billing	Responsible Party	Audit & Backup	Patient Labels
Multi User	Multi Tasking	Networks:	AppleShare, Novell, TOPS, MacServe	File Interchange with other Data Programs		

Solo and multipraction office management systems for the Macintosh.

Please CALL Today!
(619) 365-9718 or
Fax: (619) 228-1567

13th Year 1990

CIRCLE 577 ON READER SERVICE CARD

Lottery

\$115.5 Million Dollar Jackpot was CRACKED!!
Using Odds Improvement Multiplication™
U.S. Patent Number #4,712,796
And now... You can control this Multi-Million Dollar Mac Lottery winning system on your Macintosh!

Harvard University Consultant confirms that the MacLotto™ process dramatically improves your odds of winning each and every time you use the system!

Penna. Doctor Wins \$8,200,000.00 Million Dollars!
"My wife and I shared the jackpot...Odds Improvement Multiplication™ gave me 12 prize wins. The Jackpot, three 2nd prizes & 8 third prizes....I'm writing to inform you that this [system] really works!" - Dr. JW Jr. of Pa.

MacLotto™ - A highly interactive program which works with every possible lottery configuration. Now and in the future. An advanced graphical interface makes it fast and easy to compute, place and verify your bets!

Lottery Shocker!!!
"It is possible to improve your odds 2,200 times over random selection of winning MILLIONS OF DOLLARS MORE each and every time you apply the MacLotto™ system!"

\$99 Complete! MC & Visa call our toll FREE number! No COD sorry.
FAX your order! 508 - 653 - 9193

U.S. Math Labs
18 Main Street
Concord Ma. 01742

1 - 800 - PLAY - SIX

CIRCLE 628 ON READER SERVICE CARD

For your ad to appear on *The Macworld Catalog* screen, call 800/888-8622.



The Macworld Catalog

Mental Arts

Mood Altering Software
Synchronicity is an entertaining personal strategy tool that helps you resolve the kind of questions logic can't handle. Turn stress into strategy. Stimulate your own intuition for a fresh, creative approach to any challenge or relationship. Beautiful art and sounds animate the Book of Changes in a relaxing, inspiring, and fun way. A life-long gift recommended by Macworld review. Only \$49.95. Visa/MC. Call now. *Visionary Software, Inc.*
P.O. Box 69191
Portland, OR 97201
800/877-1832, 503/246-6200

The Biggest Small Investment You Can Make.

Take advantage of the direct link with your buyers that maximizes exposure at a low cost.

The *Macworld Catalog* reflects the expanding corporate Macintosh audience whose purchasing activities increasingly include mail order. The cost-effective direct response advertising available monthly in *The Macworld Catalog* links you instantly with nearly 500,000 qualified buyers.

Get into the link. Call 800.888.8622 and place your ad now!

800.888.8622

Music/MIDI

MIDI BLUES?



MacBEAT specializes in Sequencing, Notation, Sampling, and Editing programs. We can help you make the right choices for designing or augmenting your MIDI Studio. We offer the best prices and support for all Music Software, MIDI Interfaces, and peripherals. Our exclusive Music Accelerator Pamphlets and diskettes are designed to help you get rolling.

Mac BEAT!

320 Paseo de Peralta, Suite E
Santa Fe, New Mexico 87501
1-800-MAC-BEAT
Mon-Sat 8 am-9 pm Pacific Time

CIRCLE 656 ON READER SERVICE CARD

2.2 Now with chord ear training

PRACTICA MUSICA

Ear Training & Music Theory for Everyone

"Best New Education Program, 1987"
—MacUser Magazine

- Teaches intervals, chords, melody, rhythm
- Interactive staff notation • Saves scores
- High quality sound • MIDI compatible
- Historical & computer-generated melodies
- Custom ear training melodies
- Includes textbook • Beginners to advanced

\$125 • Call Toll Free 800-445-4866

ARS NOVA
BOX 637, KIRKLAND, WA 98083

CIRCLE 560 ON READER SERVICE CARD

Programming Tools

MACINTOSH CROSS ASSEMBLERS

μASM™ **NEW!!**
Version 3.0!

- TEXT EDITOR, CROSS ASSEMBLER, AND COMMUNICATIONS FACILITY IN A COMPLETE INTEGRATED DEVELOPMENT ENVIRONMENT
- MACROS
- CONDITIONAL ASSY
- LOCAL/AUTO LABELS
- SYMBOL TABLE CROSS REF
- S OR HEX FILE OUTPUT DOWNLOADS
- TO MOST EPROM PROGRAMMERS

us **\$149.95**
EACH PLUS S/H*

AVAILABLE FOR MOST 8-BIT MICROPROCESSORS. CALL OR WRITE FOR TECHNICAL BULLETIN. 30 DAY MONEY BACK GUARANTEE. MC/V/AE.

Micro Dialects, Inc
DEPT. MW, PO BOX 30014
CINCINNATI, OH 45230
(513) 271-9100

* PER SHIPMENT:
\$4 CONTIGUOUS USA
\$8 50 CANADA AK, HI
\$15 INTERNATIONAL

CIRCLE 624 ON READER SERVICE CARD

Public Domain

Blank Disk Battle!

The Lords of Shareware now pass on massive savings — prices yet unheard of in the USA! Our considerable buying power allows us to sell:

5.25" (With Sleeves)
DS/DD 100's @ 25¢ 1000's @ 24¢
Colored DS/DD @ 29¢ in 100's (Call!) • DS/HD 50's @ 43¢ 1000's @ 40¢

3.25" (Suitable Amiga, IBM, ST, MAC)
DS/DD 50's @ 48¢ 1000's @ 46¢
DS/HD (IBM 1.4 Mb) 50's @ \$1.45, 1000's @ \$1.40
Black and Colors Available

Pre-formatted Disks!
Save Endless Hours of Formatting:
IBM 5.25" DS-DD 38¢ in 100's
IBM 5.25" DS/HD 69¢ in 50's
IBM 3.5" DS-DD 58¢ in 50's
IBM 3.5" DS/HD \$1.95 in 50's
MAC 3.5" DS-DD 79¢ in 50's
ST 3.5" DS-DD 79¢ in 50's
AMIGA 3.5" DS-DD 79¢ in 50's
ALL DISKS 100% GUARANTEED & CERTIFIED!

DUPLICATION Prompt & efficient duplication service on all formats! Please call for further details.

SHIPPING & HANDLING
Add \$4 for first 100 or less, and \$1.00 per 100 thereafter. Goods are subject to availability and prices are subject to change without notice.

Owners of the Following Computers — Call Now Toll-Free for THE LATEST, GREATEST SHAREWARE AND PD CATALOGS IN THE BUSINESS!

**MAC — APPLE II — AMIGA
ATARI ST — C64 — ATARI 8BIT**

Call this number only for blank disks and non-IBM shareware catalogs — Use 1-800-346-0139 when ordering IBM shareware.

1-800-782-6861

GEMINI™
Marketing, Incorporated

12404 SE 38th St.
Bellevue, WA 98006 USA
Foreign: (206) 746-7671
FAX 206-788-0717

CIRCLE 653 ON READER SERVICE CARD

Call for a FREE Guide to Public Domain & Shareware

Or pay the \$3 shipping and also get a **FREE DISK** of essential utilities for the Macintosh.

1-800-2424-PSL

Public (software) Library
P. O. Box 35705, Houston, TX 77235-5705

CIRCLE 679 ON READER SERVICE CARD

FREE! MAC CATALOG

Software, Ribbons, Labels, Books, Etc.

Best Bits & Bytes
P.O. Box. 8225-MACW
Van Nuys, CA 91409

CALL NOW!
TOLL FREE-24 HRS.
1-800-245-BYTE

CIRCLE 572 ON READER SERVICE CARD

"I saw it in Macworld!"

For your ad to appear on *The Macworld Catalog* screen, call 800/888-8622.

The Macworld Catalog



FREE SOFTWARE CATALOG

Over 1000 Macintosh quality software.
For fast service
Write to:

SOFTSHOPPE, INC.

P.O. Box 3678
Ann Arbor, MI 48106-3678
(313) 761-7638

CIRCLE 651 ON READER SERVICE CARD

Property Management

Comprehensive software for managing residential, commercial, condos, and more. Two versions: Basic PM for owner/manager — \$495, Deluxe PM with complete general ledger for professional management — \$1,195. Includes check writing, recurring expenses, financial statements, complete management reporting.

Yardi Systems, Inc.

813 Reddick St.

Santa Barbara, CA 93103

805/966-3666

Religion

Bible study tools that grow with you.



THE WORD processor
The most comprehensive Family of Products for Bible Study.

Start with **VERSE SEARCH** including the Bible translation of your choice with Instant Access to any verse. Search for any words or phrases. Separate windows for comparing verses. And much more! Only \$99.95

AS YOU GROW, add NIV, RSV, KJV or NKJV text, Greek or Hebrew transliterators or topical cross references, personal commentary, a chronological Bible and chain references. Our memory resident

VERSE TYPIST transfers verses to your word processor.

Bible Research Systems

1-800-423-1228

2013 Wells Branch Parkway #304 • Austin, Texas 78728

Tech Support (512) 251-7541 Postage extra. For IBM, MSDOS, Macintosh.

CIRCLE 568 ON READER SERVICE CARD

Real Estate

Reference

Real Estate Software

The Ten Minute

■ Property Manager \$195

Accounting system for multiple properties. Ideal for investors who manage their own properties.

■ ProAnalysis \$295

A sophisticated investment analysis program designed for the investor who demands professional quality analysis.

Demos Now Available!

Metropolis
Software

499 Hamilton Ave.
Suite 202
Palo Alto, CA 94301
(415) 322-2001

CIRCLE 623 ON READER SERVICE CARD

The Birthday Book

A Treasury of Names & Birthday Lore. Meaning & Origin of over 15,000 Names, Birthstones, Gems, Birthday Flowers, Colors & their Meanings. Astrological Signs & affinities, Wedding Anniversaries And More. Discover the ones for you, your family & friends. The most comprehensive listing ever \$35+4 s/h.

ImaTeQ Systems

#125 3533 31 St. N.W.

Calgary, Alberta, Canada T2L 2K7

Collect 403/282-6720

Property Management III

RealData's latest — A comprehensive management and accounting package for residential and commercial property, **PM III** is ideal for the individual owner as well as the professional manager. It offers integrated AR, AP and GL, maintenance tracking, lease abstracting, and extensive management and financial reporting. \$1495 to handle unlimited properties/units, \$695 for limited (100-unit) version.

Evaluation copy, with documentation, just \$45 (plus s/h)

Also New: **Real Estate Partnership Plus** Analyze investments to be structured as limited or general partnerships. Handles allocations of income, cash flow, profit, preferred return. Requires Excel. \$295

Finally, don't forget our best seller, **Real Estate Investment Analysis** for cash flow, profit and those complex tax calculations. \$250

REALDATA[®]
78 North Main St., South Norwalk, CT 06854

ORDERS ONLY 1-800-899-6060
INFO (203) 255-2732
FAX (203) 852-9083

CIRCLE 638 ON READER SERVICE CARD

Church Data Master Plus

for comprehensive data management for churches of all sizes.

Membership - \$265.

Contributions - \$265.

Accounting - \$265.

Integrated Package - \$795.

Multi User (3) \$995.

Multi User (4-10) \$1,395.

Full working demo send \$10.

Computer Helper Publishing

5898 Cleveland Avenue

Columbus, OH 43231

1-800-533-5227

Church Master

Written by computer professionals involved in church management.

Skilled users love its power, depth and flexibility. Novices love its ease of use.

13 optional modules with support and upgrades. For Macintosh, IBM compatibles, XENIX, LANs. We understand computers and churches.

Summit Systems, Inc.

Suite 121, 16 Berry Hill Rd.

Columbia, SC 29210

803/798-9749 FAX: 803/731-0349

For your ad to appear on *The Macworld Catalog* screen, call 800/888-8622.



The Macworld Catalog

Sales/Marketing

Market Master for Mac
MacGuide calls it "the Best Sales lead follow-up you can buy." Enter leads whenever you get them & MarketMaster™ contacts the right people the right way at the right time. Prints letters, envelopes, phone lists, scripts, & NEVER FORGETS! Easy to learn & use. Frees salespeople to SELL & supports them to SELL MORE!
Breakthrough Productions
10659 Caminito Cascara
San Diego, CA 92108
619/281-6174

Scientific

Geological Software
Great graphics, low prices! • Lithologic log plotting • Gridding • Contouring • Piper/Stiff plots • Oil & Gas economics • Stereonet plots • Plate tectonics • Geophysical modelling, +much more for the Macintosh & PC \$50-\$1500. Call or write for FREE catalog of easy-to-use software products.
RockWare Inc.
4251 Kipling, Suite 595
Wheat Ridge, CO 80033
303/423-6171, Telex: 9102504964

Self Improvement

Goal Writer
The key to "Success" is writing down your own goals. Goal Writer takes your aspirations and dreams and turns them into realistic and effective goal plans. This \$99 hypercard stack guides you through the goal writing process starting from self evaluation, all the way to organizing them into seven major areas of life.
Attn: Michael Wharton
Goal Writers Co.
1307 Brooktown Avenue
Winston-Salem, NC 27101
919/724-3445

Spreadsheet

Spreadsheet Compiler

At last, you can convert your Microsoft Excel templates into royalty-free stand alone applications. This means big savings for your users and increased sales for you because your users no longer need a spreadsheet program to run your templates. Now you can protect your investment and create quality applications. For only \$495, we invite you to try Masquerade™ at no risk with our **30 Day Money Back Guarantee**. See us at MACWORLD Expo Brooks Hall Booth 5833.

To order or for more information call (714) 842-4292
Night Diamonds Software, P.O. Box 1783 Huntington Beach, CA 92647

CIRCLE 618 ON READER SERVICE CARD

Statistics

CLR ANOVA
Analysis of variance program that can compute up to a 10-way design with repeated measures and unequal n. Marginal means, plots of interactions, simple effect, range tests, contrasts, and more. Full Mac interface. Can read text files w/entries separated by spaces, commas, or tabs. \$100 + \$3 s/h.
Clear Lake Research
2476 Bolover #343
Houston, TX 77005
713/523-7842

Training

TEACH YOURSELF

Used by Microsoft and Apple for their authorized training centers in Europe

These self-paced disk & workbook based tutorials take you through the nitty-gritty and the sublime of powerhouse software with equal finesse. Most of these guides are equivalent to a full two-day training session, but can be completed in 5 to 10 hours, at your own pace and at your convenience.

Top Tutor - MacWorld Magazine's pick for the best tutorial in its class. - February 1990
A touch of class - MacUser

Choose from
Teach Yourself Excel
Teach Yourself Word
Teach Yourself PageMaker
Teach Yourself 4th Dimension
Teach Yourself Hypercard
Teach Yourself QuarkXPress

TUTORLAND CORPORATION

PO Box 160429 • Cupertino, CA 95016 • (408) 973-0472

To Order, Call 1-800-888-8689

Major Credit Cards accepted

All Tutorials are 79.95 • Add \$6 for shipping and handling

CIRCLE 637 ON READER SERVICE CARD



SOFTWARE

INSURES YOUR COMPUTERS

Full replacement of hardware, media, purchased software. As low as \$49 yearly. Covers fire, theft, power surges, other accidents. Blanket coverage; no list of equipment needed. Call for information or immediate coverage.

1-800-848-3469
Local (614) 262-0559

SAFEWARE, The Insurance Agency Inc.
2929 N. High Street, P.O. Box 02211
Columbus, OH 43202

CIRCLE 640 ON READER SERVICE CARD

Services

Computer Insurance



DSI provides you with coverage for all common risks, even lost data, and theft from an untended vehicle. As low as \$35/year.

DATA SECURITY INSURANCE

The ONLY "ALL-RISK" Policy
Call today for immediate coverage.
1-800-822-0901

CIRCLE 590 ON READER SERVICE CARD

Data Conversion

TAPE/DISK CONVERSIONS

Conversion services to or from over 2000 computer systems:
• Magtapes • Mini Computers
• Micro Computers • Typesetters
• Word Processors

CALL THE INDUSTRY LEADERS

PIVAR COMPUTING SERVICES, inc.

800-HI-PIVAR
165 Arlington Heights Rd #MC
Buffalo Grove, IL 60089

WE CAN CONVERT DATAFILES TO/FROM OVER 1,500+ SYSTEMS IN VIRTUALLY ANY FORMAT! — ON DISKS OR TAPES!

Systems like:

- Mainframes
- Minis
- Microcomputers
- Dedicated Word Processors
- Typesetters, etc.

Formats like:

- MacWrite*
- Microsoft Word*/Works*
- WordPerfect*
- Omnis*
- 4th Dimension*
- FileMaker*
- Jazz*
- Excel*
- Tab-delimited ASCII, etc.

*Trademarks of their respective companies

CompuData Translators, Inc.

3325 Wilshire Blvd. Ste. 1202
Los Angeles, CA 90010

800/825-8251 • 213/387-4477

CIRCLE 579 ON READER SERVICE CARD

For your ad to appear on *The Macworld Catalog* screen, call 800/888-8622.

The Macworld Catalog



Desktop Publishing

IMAGESSETTING

- Varityper™ 4300's-1200/2400dpi
- Color PostScript® Printing
- Color/B&W/OCR Scanning
- Full Electronic Pre-Press
- Color Separations/Proofs
- Photoshop™ 32-bit Retouching
- Direct to Plate Color Printing

ImageSet
Service Bureaus Printing Centers

111 West Kingsley, Ann Arbor, MI 48103
313/668-7330 • 24 hr BBS 313/668-6319

CIRCLE 660 ON READER SERVICE CARD

We Challenge You...

to find a service bureau that provides 1,200 and 2,400 dpi PostScript® output on RC paper, film and plates with:

- Consistently lower prices
- A money-back guarantee
- No minimums
- Easy credit terms
- Free 24 hour turnaround

Well, look no further:

Icons & Images, Inc.™

Box 434

Greenwich CT 06836

800/869-9059

203/661-4469

FAX/BBS, 203/629-1695

Laser Recharge

reconditioned **TONER** cartridges!
for laser printers & Canon PC Copiers

BETTER THAN NEW!

- 20% MORE TONER
- DARKER PRINT
- 100% GUARANTEED

From **\$44.95**

We buy empties
call for brochure
800-426-8196

Willow Products Corp.
3857 Willow Ave, Pgh, PA 15234

WILLOW

CIRCLE 673 ON READER SERVICE CARD

laserSaver **LONG-LIFE RECHARGED TONER CARTRIDGES**

1352 Fifth Ave • San Diego • CA • 92101

\$44 Return Shipping Included

- 30% More Printing
- Your Cartridge
- Blacker Blacks
- Colors Available
- 24-hr Turnaround
- 100% Guaranteed

1-800-234-3383

CIRCLE 612 ON READER SERVICE CARD

Waldman graphics

Printers + Typographers

Desktop Designer's Super Service Bureau

Maintain highest quality standards and lower your costs. We can accept any PostScript file for B/W and full color output. Original electronic art and PostScript effects our specialty. Complete Visionary Gateway and V.I.P. services to powerful Scitex color center. Knowledgeable people, high resolution output, color proofing, quick turnaround.

- 1270 & 2540 dpi pages from Linotronic L300s ■ Repro, Pos. & Neg. film ■ Disk Conversion ■ 24 hour Modem ■ QMS ColorScript 100
- Scitex Color Imaging & Separations
- Full Electronic Prepress ■ High Quality Color Printing ■ Mailing
- 20 Messengers to NYC, Phila., N.J.
- Discount Adobe Dealer

Call Mike Gladden or George Gunzelman for more information about our extensive DTP services.

609/662-9111 800/543-0955
Modem - 609/662-3788

CIRCLE 669 ON READER SERVICE CARD

We image: PICT, PICT 2, 32-bit PICT, Scrapbook, TIFF, PostScript



\$5 Slides

The "original" Mac \$5 imaging service!

- True customer service
- Unsurpassable 4K quality
- Color overheads and hard copy available

24 Hour Turnaround Standard (Rush Available)

In NY State Call: 212.989.2727 Outside NY State Call: 800.445.9002

Nextwave Productions NYC, NY
Visa, MasterCard, American Express, Corporate Accounts

CIRCLE 557 ON READER SERVICE CARD

TONER **2 DAY AIR Return Delivery**

Your Cartridge: for HP, Apple, etc. rebuilt

24 hour turnaround
100% Satisfaction
Toner for NEC, Ricoh, Panasonic, Qume, etc.

LASERQuip brand cartridge for HP, etc.

Black46.50
Colors61.50
PC81.50
PC\$1.50

HP II-P cartridges rebuilt: 46.50
New cartridges from 79.50

800-777-8444

7615 Washington Ave. S. Edina, Minnesota 55435

•Franchises
•Wholesale

CIRCLE 611 ON READER SERVICE CARD

SLIDES!

ATTENTION USERS OF

- POWERPOINT 2.0
- PERSUASION
- STAND OUT!
- MORE !! • MUCH MORE!

DIGITAL PHOTO

WILL IMAGE ANY PICT OR 24 BIT TIFF FILES.

24 HOUR MODEM
2 FREE SLIDES
WITH FIRST ORDER

CALL FOR INFORMATION:
402-393-1744

\$7

CIRCLE 585 ON READER SERVICE CARD

Questions?

Use the Reader Service Card to request free information about the products you see in *The Macworld Catalog*.

For your ad to appear on *The Macworld Catalog* screen, call 800/888-8622.



The Macworld Catalog

Training

BSc & MS in COMP SCI
The American Institute for Computer Sciences offers an in-depth correspondence program to earn your BSc & MS degrees in Computer Science at home. BSc subjects include: MS/DOS, BASIC, PASCAL, C, Data File Process, Data Structures & Operating systems. MS program includes Software Engineering and AI.

AMERICAN INSTITUTE for COMPUTER SCIENCES
1704-MW 11th Avenue
South Birmingham, AL 35205
205-933-0339

Mouse Pads

Custom Printing Available.

Cloth: 13 Colors

Size:	8x7 1/4	8x9 1/2	8 1/2 x 11
12 Pads	3.25	3.50	3.75
72	3.00	3.25	3.50
144	2.85	3.00	3.25

PLASTIC: Blue, Platinum, Gray, Red & Black. Size: 8 1/2 x 11

12 Pads	6.50	36	6.00
72	5.75	144	5.25

ASK US ABOUT OUR PICTURE PADS!

Precision Line Inc.

14100 23rd Ave. N.

Minneapolis, MN 55447

612/557-1979, 1-800/328-0077

Supplies

HIGH DENSITY 1.44 MB 100% ERROR FREE

1.44 MB \$1.50 (each 100 of 25)

5.25" DS/HD 1.2 MB DK. BLUE - 69¢
PACKED IN LOTS OF 100 WITH TYVEC SLEEVES & TABS

5.25" DS/HD 1.2 MB, INCL. Sleeves & Tabs, BLACK
Lots of 100 - 49¢ Lots of 50 - 59¢

5.25" DS/DD 360K, INCL. Sleeves & Tabs
Lots of 1,000 - 21¢ Lots of 200 - 25¢

3.5" DS/DD 720K (1MB)
PREMIUM QUALITY BULK Lots of 50 - 49¢

3.5" DS/DD 720K (1MB) - SONY BULK
Lots of 50 - 79¢ Lots of 25 - 89¢

3.5" DS/High Density 1.44MB (2MB)
PREMIUM QUALITY BULK Lots of 25 - \$1.50

AMERICAN GROUP
800-288-8025
12132 Sherman Way, N. Hollywood CA 91605
CALL OR MAIL

CIRCLE 676 ON READER SERVICE CARD



The Best Case Scenario

Airline Check-in or Local Use

Zero Halliburton Aluminum Mac Cases: Lightweight, Durable, Distinctive Styling Plus/SE IIcx II/IIx Monitor Cases Portable Attache ImageWriter II

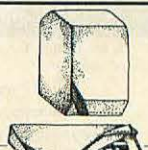
from \$299.95 1-800-542-4591

TCC 13101 Wash. Blvd., #110, L.A., CA 90066

CIRCLE 607 ON READER SERVICE CARD

Dust Covers

for a Clean Machine



Protect your equipment from dust, spills, and aggravating downtime with ABCOM DUST COVERS for personal computers.

Attractive, water-resistant packcloth in NAVY, SILVER, or BROWN



MAC & VISA ACCEPTED. PLEASE WRITE OR CALL FOR COMPLETE PRICE LIST AND BROCHURE.
2333A N. SIERRA HWY., BISHOP, CA 93514
619/872-1946

CIRCLE 552 ON READER SERVICE CARD

Reclaims Desk from Disks

The VDS 240

Vertical Disk Storage
• Holds 240 Disks
• Mounts on Wall
• From Desk Space



To Order: 1-800-942-4008

Vertical Solutions • P.O. Box 7535 • Olympia, WA 98507 • 206/352-2097
CIRCLE 694 ON READER SERVICE CARD

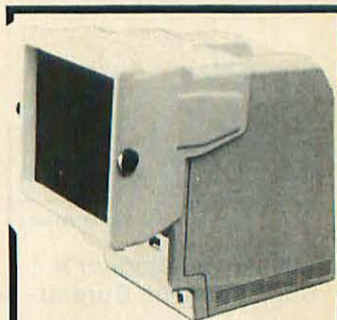
DUST COVERS 100% COTTON CANVAS

ComputerWear

MAC, SE, II, & PRINTERS
Beige w/ Grey Trim Breathable! Static-Free!

NEW! Seal-Skins
For Keyboards

1-(800) 826-5761
Int'l: (415) 759-1466 Fax: (415) 564-0506
Contemporary ComputerWear 1320-36th San Francisco 94122



NUVU GIVES EYESIGHT TO THE MAC BLIND

ENLARGE YOUR MONITOR SCREEN OVER 70%!

High quality lens by 3M coupled with a Polaroid anti glare filter. In a sleek mounting hood designed specifically for Mac monitors.

FINALLY A CLEAR PICTURE!

Retail price \$149.95
To order, or for more info:

• 800-872-1051 •

Other models available.
Dealer inquiries invited.

Less Gauss Inc.
Box 5006 Rhinebeck, N.Y. 12572

CIRCLE 601 ON READER SERVICE CARD

June Catalog ad close date:
March 21, 1990

Call 800/888-8622 to reserve space.

For your ad to appear on *The Macworld Catalog* screen, call 800/888-8622.

The Macworld Catalog



3.5" DS/DD Bulk Disks
39¢ ea. in lots of 25

3.5" DS/HD Bulk Disks
89¢ ea. in lots of 25

3.5" Disk Cases - Protects up to 50 Disks
\$2.97 each (for 2 or more)

Apple ImageWriter I & II Ribbon
\$1.67 each (In Packs of 6)

4-Color Apple ImageWriter II Ribbon
\$5.97 each (In Packs of 2)

Mouse Pad **\$2.99** each

3.5" User Labels - In Assorted Colors
(\$1.50 per pack of 50 labels)

Add shipping - 50¢ per 25 3.5" disks; 75¢ per disk case; \$1.50 per pack of ribbons; 50¢ per mouse pad; User Labels - No shipping charge

Add Order Processing, Packaging & Handling - \$3.00 Per Order

MEI/Micro Center - 1100 Steelwood Rd.
Columbus, Ohio 43212

Call 1-800-634-3478



Mailing Lists

MAILING LIST of Mac Users

On labels, tapes, disks, CD-ROM, or by modem



Choose from hundreds of thousands of users at residences, businesses, or schools, in any ZIP code range. 2¢ to 5¢ per name. Free selecting, sorting, delivery. Call for free custom counts.

Semaphore Corporation, 207 Granada Dr., Aptos, CA 95003
(408) 688-9200 (voice) 662-2717 (modem)

CIRCLE 642 ON READER SERVICE CARD

**You Can
Access More
than
375,000
Macintosh
Buyers**

Put your product in front of the people who do more than just shop. Your ad in *The Macworld Catalog* links you instantly with more than 375,000 qualified buyers.

The Macworld Catalog is the direct response section for the Macintosh marketplace. It's action-oriented advertising that reaches the experienced users who know what they want, want it fast, and look for it here—each and every month.

The most readers. The least cost. Immediate access. Just call *The Macworld Catalog* at 800/888-8622 and place your ad—today!

800/888-8622

Miscellaneous Business Opportunities

In every growth industry there can be only one leader. One company with the best combination of product quality, management experience and proven success. In the promising world of toner recharging, only one company is at the top—LaserCharge.

And there is still room for you in our future. We've got the most advanced technology, training and marketing

support in the industry. LaserCharge offers its licensees everything they need to get their business off to a strong start.

Find out more about the exciting growth opportunities in the toner recharging industry. Build a better bottom line by starting at the top. Call LaserCharge today.

800-999-8134

**There's Still Room
at the
Top**

LaserCharge

11130 Metric Boulevard, Austin, Texas 78758

CIRCLE 597 ON READER SERVICE CARD



Pack your Mac in seconds!

Cordura case has internal padded pockets for mouse, keyboard and drive. Available in six colors. Extended Keyboard version also available.

For a dealer near you
call toll free

1-800-548-0053

West Ridge Designs
1236 N.W. Flanders
Portland, OR 97203

CIRCLE 670 ON READER SERVICE CARD

For your ad to appear on *The Macworld Catalog* screen, call 800/888-8622.

BEST-SELLERS

Months on chart	Last month	This month	
▼	▼	▼	BUSINESS SOFTWARE
38	2	1	Microsoft Works Microsoft
59	1	2	Microsoft Word Microsoft
50	3	3	Microsoft Excel Microsoft
46	4	4	Aldus PageMaker Aldus
35	5	5	MacWrite Claris
14	9	6	QuarkXPress Quark
19	6	7	WordPerfect for the Macintosh WordPerfect
47	7	8	MacDraw Claris
12	—	9	FileMaker II Claris
5	10	10	Wingz Informix

EDUCATION SOFTWARE

13	1	1	Where in the World Is Carmen Sandiego? Brøderbund
26	2	2	Reader Rabbit The Learning Company
42	3	3	Math Blaster Davidson & Associates
5	4	4	Math Rabbit The Learning Company
32	—	5	KidsTime Great Wave Software

ENTERTAINMENT SOFTWARE

42	2	1	MacGolf XOR/PCAI
2	4	2	Tetris Spectrum HoloByte
38	3	3	Dark Castle Silicon Beach Software
4	1	4	SimCity Maxis Software
16	—	5	Beyond Dark Castle Silicon Beach Software

NETWORK/DATA COMMUNICATIONS

38	1	1	TOPS TOPS
34	2	2	AppleShare Apple Computer
41	3	3	LocalTalk Apple Computer
26	4	4	PhoneNet Farallon Computing
7	—	5	NetWare for the Macintosh Novell

Months on chart	Last month	This month	
▼	▼	▼	HARD DISKS*
19	1	1	MacStack SD20 CMS Enhancements
18	3	2	FX20 GCC Technologies
31	—	3	Apple Hard Disk 20SC Apple Computer
1	—	4	DataFrame XP60 SuperMac Technology
7	5	5	Rodime 45 Plus Rodime

ADD-IN BOARDS/MEMORY

27	—	1	Apple 2MB Memory Expansion Kit Apple Computer
28	3	2	Radius Accelerator Radius
24	2	3	Apple 1MB Memory Expansion Kit Apple Computer
16	1	4	Radius Interface Display Radius
3	—	5	2MB Expansion Board Mac Products USA

PRODUCT WATCH

Recent or forthcoming products of particular interest.

ComputerEyes *Digital Vision* Low-cost 24-bit color digitizer

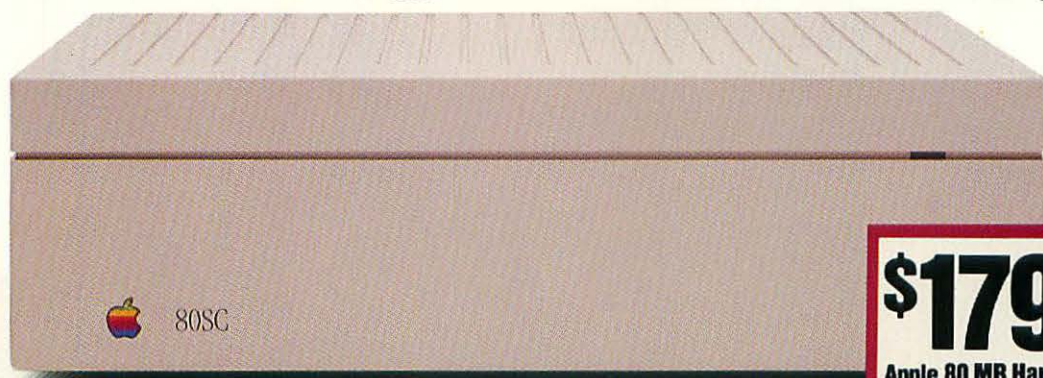
ParaFont *Design Science* PostScript font-editing software

PosterWorks *S.H. Pierce & Co.* Software for large-scale color PostScript images

Source: Exclusive InfoCorp survey of more than 125 Macintosh retailers and selected mail-order vendors. Covers sales during December 1989.

*Does not include hard disks installed at the factory.

This is Apple's Best Buy on a Big Hard Drive;



\$1799

Apple 80 MB Hard Drive

This is Ehman's.



\$749

Ehman 45MB Removable

The perfect hard drive would have unlimited storage capacity, be lightning fast and be as reliable as rain in Seattle in the springtime. And, oh yes, it would have all of the above, at a price that would make the stingiest Scrooge smile.

Using that criteria, the Ehman 45MB removable just may be the perfect hard drive.

Its storage capability expands with your needs. For more storage capacity all you do is buy another 45MB removable cartridge for just \$99. Buy as many as you need. In fact you could buy 10 cartridges, almost 500MB of storage, and still pay less than an Apple 80MB fixed hard drive.

With an access speed of just 20 ms, the Ehman removable will hold its own with just about any hard drive on the market. And with a reliability

rating of 30,000 hours and a warranty of 2 years, you can be assured that in this case, speed doesn't burn. For another \$20, you can have complete assurance and overnight service, with the Ehman Express Service Program.

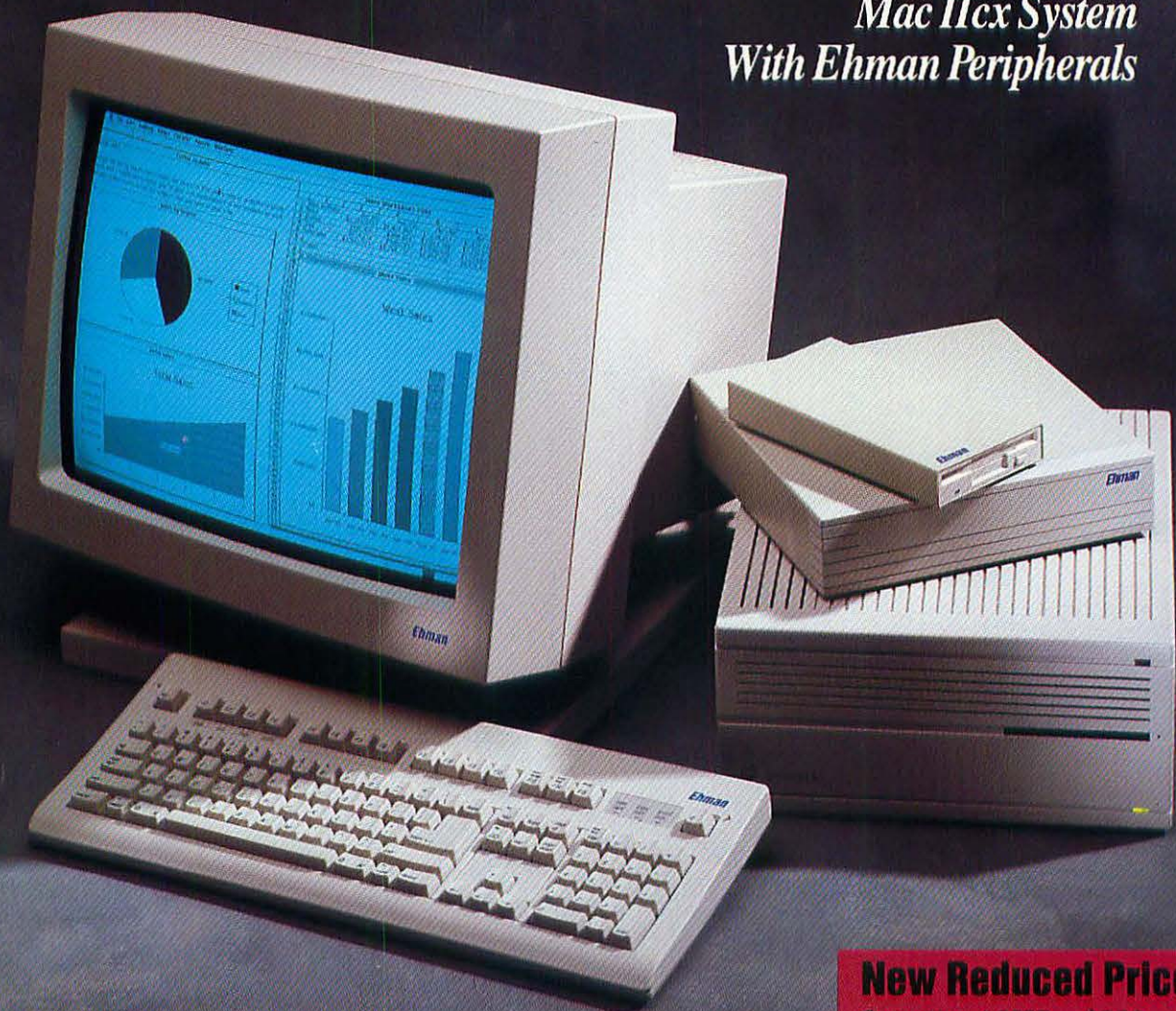
The best part is that our best buy on a big drive won't burn a hole in your pocket. At just \$749 including one cartridge, the Ehman removable costs less than half of the Apple 80MB drive and comes with a 30 day, no questions asked, money back guarantee. Give us a call today at 1-800-257-1666 and see first hand why Ehman is now the fastest growing manufacturer of Macintosh peripherals.

Ehman

1-800-257-1666

Circle 500 on reader service card

*Mac IIcx System
With Ehman Peripherals*



New Reduced Prices!

Quantum 40MB — \$399
Quantum 105MB — \$699

Notice The Difference, Certainly Will.

think again. Our monitor has a flicker-free refresh rate higher than either Apple or Radius. And our hard drives are now significantly faster thanks to new caching software, and still come with reliability ratings up to 100,000 hours between failures.

So before you pay top dollar for a premium label, give Ehman a call at 1-800-257-1666 and see about an alternative that makes a very big difference—to your pocketbook. One look and you'll know why we're now the fastest growing peripheral manufacturer in the business.

Hard Drive Prices

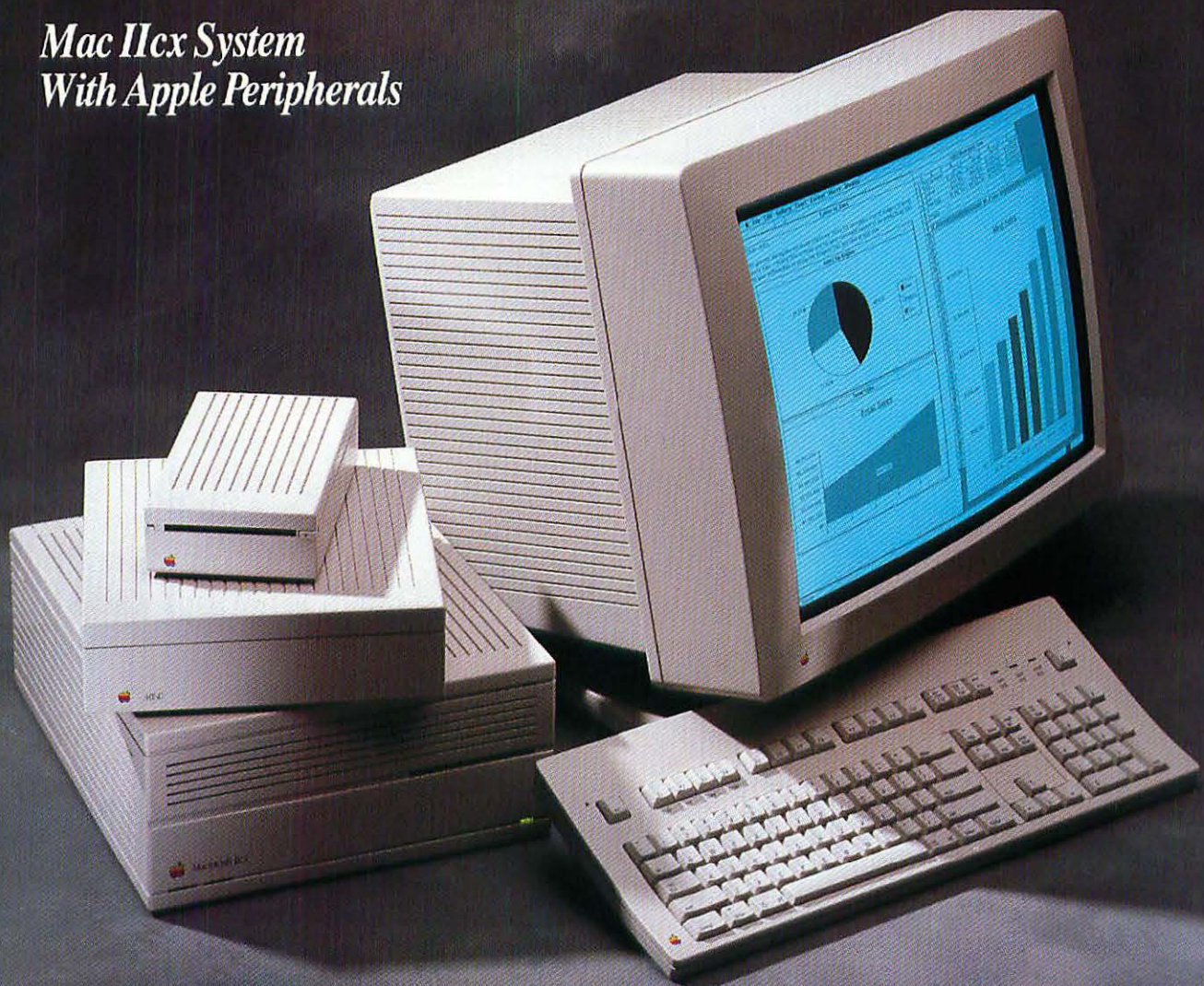
Size (MB)	Internal	External
20	\$299	\$349
30+	\$349	\$399
40Q	\$399	\$479
45	\$399	\$449
60+	\$479	\$549
80+	\$529	\$599
105Q	\$699	\$799
135	\$899	\$999
180	\$1,049	\$1,149
45 Removable		\$749

Ehman
The Apple Alternative

Call 1-800-257-1666
or 1-307-789-3830
Fax 1-307-789-4656

Circle 154 on reader service card

Mac IIcx System With Apple Peripherals



Most Users Won't No But All Buyers

Next time you buy peripherals for your Macintosh, make sure you look at the price tag and not just the label. You'll find big differences between Apple and Ehman.

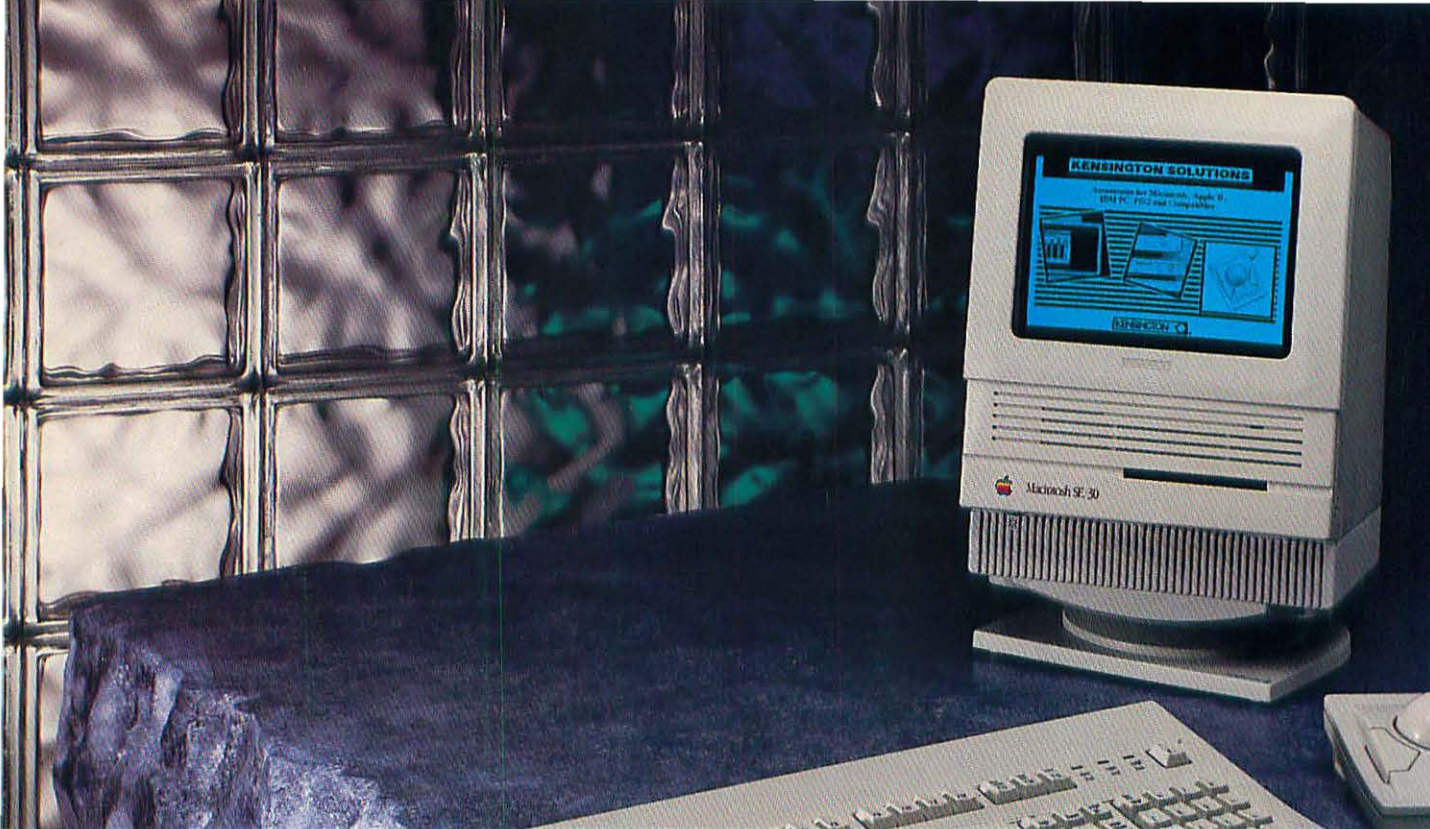
First and foremost, Apple is in the business of making computers. Ehman is in the business of making computer peripherals. And since 1985 we've been out front in providing Macintosh users with the best combination of price and performance available. Like a 20 MB

hard drive for just \$299, or our new two-page monochrome monitor for only \$899 including video card and tilt/swivel base.

We can save you hundreds of dollars over a peripheral with an Apple logo on it. What's more, you'll enjoy the added benefits of a lengthy warranty, free direct-telephone support, free third-party utility software, a 30 day moneyback return policy and even an optional, overnight loaner service program.

And, if you thought you would have to make major concessions in quality,

Apple	Ehman
Mac IIcx . . . \$4669	Mac IIcx . . . \$4669
80 MB External Hard Drive . . . \$1799	80 MB External Hard Drive . . . \$599
2-Page Monitor with Card . . . \$2748	2-Page Monitor with Card . . . \$899
101 Extended Keyboard . . . \$229	101 Extended Keyboard . . . \$99
800K Floppy Disk Drive . . . \$429	800K Floppy Disk Drive . . . \$149
Total \$9874	Total \$6415



EYESORE VS. EYE PROTECTION

As today's monitors get bigger and brighter, anti-glare filters become less of an option and more of a necessity.

The right filter can combat eye fatigue, help eliminate headaches, even reduce overall body stress.

Yet, the irony is that something so good for your eyes can be such an eyesore.

In fact, most filters look like they belong to someone else's system.

The fit is sloppy. The colors don't match. The materials are different.

Kensington has a different idea.

Instead of making a filter that will fit on any monitor, we make filters

that will only fit a

specific monitor.

An example is our Maccessories® SE Anti-Glare Filter.

It looks so much a part of the SE, you would think it was designed by the same people who designed the SE.

Circle 30 on reader service card

The styling is complimentary. The color identical. Even the same material is used.

And unlike generic filters, the fit is perfect. So light passes through the filter, never around it.

Kensington uses only optical quality glass with a ceramic anti-reflection and scratch-resistant coating.

The result is a 96% reduction in glare. And an improvement in contrast and clarity of up to 20 times.

In short, the most advanced eye-protection system you can find today—it even filters out VLF and ELF radiation and dissipates static.

Kensington has custom designed screens for the Mac, Mac Plus, Mac SE, Apple IIGS, as well as for the entire Mac II family of large screen monitors.

For a free brochure, and the dealer nearest you, call 800-535-4242. In New York call 212-475-5200.



KENSINGTON